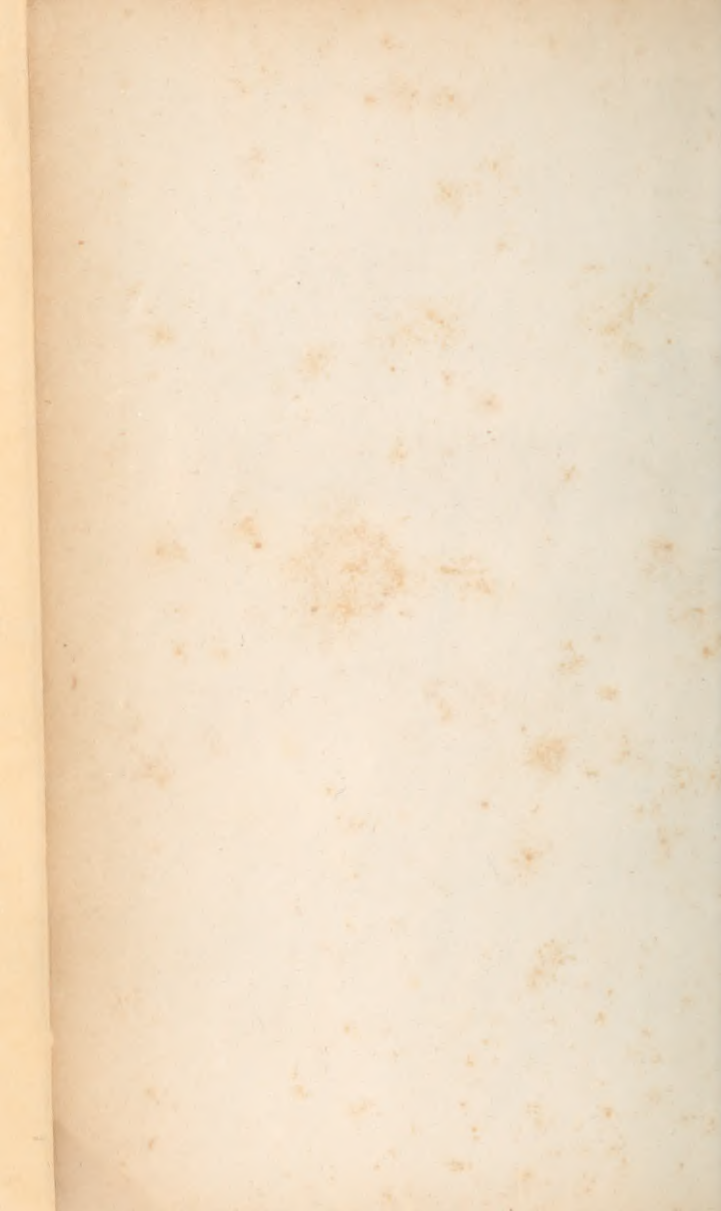


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DR. HOOPER'S
PHYSICIAN'S VADE-MECUM:

OR,
A MANUAL
OF THE
PRINCIPLES AND PRACTICE OF PHYSIC.

CONSIDERABLY ENLARGED AND IMPROVED,
WITH
AN OUTLINE OF GENERAL PATHOLOGY AND THERAPEUTICS,

BY
WM. AUGUSTUS GUY, M.B., CANTAB., &c.,
AUTHOR OF "MEDICAL JURISPRUDENCE," &c.

WITH ADDITIONS,
BY
JAMES STEWART, A.M., M.D.,
FELLOW OF THE COLLEGE OF PHYSICIANS AND SURGEONS,
AUTHOR OF
"A PRACTICAL TREATISE ON THE DISEASES OF CHILDREN," &c.

NEW-YORK:
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PREFACE OF THE AMERICAN EDITOR.

No better evidence can exist of the great practical utility of Hooper's Vade-mecum, than the many editions of it which have been published in Great Britain. The distinguished Dr. Guy has greatly enlarged and improved the original treatise by adding an outline of the advances made in medical science at the present day, and but little more is left for the American editor than the additions of such facts as appeared to him most interesting to the American practitioner. The nature of the work not admitting of very elaborate remarks, it has been his endeavor to follow the style of conciseness adopted by the author: these additions will be designated by being enclosed in brackets.

JAMES STEWART.

New York, November, 1846.

THE HISTORY OF THE UNITED STATES

OF AMERICA

FROM THE FIRST SETTLEMENTS TO THE PRESENT TIME

BY
JOHN F. JOHNSON
OF THE
NEW YORK PUBLIC LIBRARY
ASTOR LENOX AND TILDEN FOUNDATIONS
1897

EDITOR'S PREFACE.

A WORK to which the familiar name of Dr. Hooper is attached, must of necessity find its way into the hands of many readers. This consideration gives to the present publication an importance which its small size and unpretending character would scarcely claim for it; and it is this which has induced the editor to undertake the task of preparing it for the press.

From the author's preface, it appears that the only object contemplated in the first editions of this work was that of furnishing a concise treatise on the practice of medicine for the use of the student and practitioner. In the last two editions, however, an introductory part was added, containing a short outline of Physiology, Pathology, and Therapeutics, some brief directions for clinical examination, and a sketch of symptomatology and semeiology. This part, which did not occupy more than sixty-five pages, was entirely rewritten by the present editor, and extended to nearly one hundred and fifty pages; and in this edition it has been still further enlarged, and, in some parts, remodeled.

In its present form, therefore, this work consists of two parts, corresponding to what is commonly understood by the terms general and special pathology and therapeutics.

The first part consists of four chapters. The first chap-

ter, headed "Health and Disease," consists partly of definitions and explanations of terms, and partly of practical observations on the circumstances which exercise the strongest influence on the human body in its healthy and morbid state. An outline of Physiology and General Pathology forms the subject of the second chapter, in which an attempt is made to bring together some of those facts and theories that admit, either directly or indirectly, of practical application. Those functions of the body which attract most attention at the bedside, and those methods of examination which are of most constant application, form the subjects of the third chapter. They are the examination of the blood and urine; of the chest and abdomen; of the pulse and respiration. In this part of the work, the object of the editor has been to furnish the most exact information concerning the functions of the body in a state both of health and disease; and with this view he has embodied his own original observations on the pulse and respiration. The last chapter contains a brief outline of General Therapeutics; with the addition of Tables of the Doses of the more important remedies, of the proportion of the more active ingredients contained in the preparations of the pharmacopœia, and of the doses proper for each age.

Throughout this first part, the editor's object has been to make the work useful as a book of reference at the bedside; at the same time, he has endeavored so to connect its several parts together as to offer some inducement to the reader to study it as a whole.

In the second part, which answers to the original work,

very extensive alterations have been made. Cullen's nosology has been laid aside, and an arrangement has been adopted which brings together the diseases that affect the same organs, or are otherwise nearly allied to each other. No attempt has been made to form a nosological system, but the diseases are, for the sake of convenience, thrown together in separate chapters.

Many liberties have been taken with the text. The prescriptions have been thrown together at the end, and carefully arranged under distinct heads, instead of being scattered through the body of the book; many parts of the work have been so much shortened as to admit of the introduction of a great number of diseases not described in former editions; many others, which were only incidentally mentioned, are treated under separate heads; and a still greater number have been so much altered as to be nearly new.

Among the additions to the second part made by the present editor, may be mentioned, general observations on continued fevers, puerperal fevers, plague, muscular rheumatism, neuralgia, cephalalgia; and among the diseases which have undergone the greatest alteration, infantile fever, diarrhœa, hydrophobia, laryngitis, asthma, phthisis, diabetes.

In the present edition still more extensive alterations and additions have been made. Many diseases not described in former editions have been added, many others have been materially curtailed by the omission of observations not having a practical bearing, and the work has been in-

creased by a brief description of diseases of the eye, ear, and skin.

The editor has referred in the body of the work to those authors to whom he is under the greatest obligations.

Original observations or practical remarks, embodying the results of the editor's own experience, are distinguished by the initial G. A copious index, prepared with much care, completes the volume.

In the first part much assistance has been derived from Dr. Baly's translation of Müller's Physiology, and, throughout the first and second parts, from Dr. Watson's admirable Lectures on the Principles and Practice of Physic, and from the many excellent practical treatises in the Encyclopædia and Library of Practical Medicine.

WILLIAM A. GUY.

15 Bloomsbury Square, February, 1846.

AUTHOR'S PREFACE.

THE following concise account of the several diseases that fall under the province of the physician was committed to the press with the hope of its proving useful to students, and those practitioners in medicine who, from their professional occupations or other circumstances, may not have it in their power to consult the more voluminous works that have contributed so much to the improvement of medicine.

The very extensive sale of the work, and its having been translated into most of the Continental languages, induce the author to believe that his labors have been generally approved.

It has been his object to compress, within a smaller compass than has hitherto been done, consistently with utility, every thing which more especially deserves attention with a view to the treatment of diseases. In pursuing this design, he has discarded all theory, and retained only those leading facts with which it is absolutely necessary for a practitioner to be acquainted when he approaches the bedside of his patient.

Under distinct heads are arranged,

1. The characteristic symptoms by which diseases are known.
2. The causes from which they most frequently have their origin.

3. The circumstances that more especially point out the difference between diseases which resemble one another.
4. The signs which influence the judgment in forming a prognosis of their event.
5. That mode of treatment which, in the present improved state of medicine, is deemed most appropriate, and which experience has sanctioned.

The select Collection of Formulæ, Glossary of Terms,* and the Table showing the Doses of all valuable medicines he employed, will, the author trusts, combine to render the volume more extensively useful.

Saville Row, August, 1823.

* The Glossary of Terms has been omitted in this edition; the Collection of Formulæ has been greatly enlarged and rearranged; and the Table of Doses has been remodeled.

INTRODUCTION.

1. THIS work is intended to be, in the widest and truest sense of the term, a practical work. To carry this intention into effect, it will be necessary to bring together into a small compass, and in a form easy of reference, those items of information which the practitioner would desire to be possessed of when he stands at the bedside, or when he studies an individual case with a view to its treatment.

2. The first and most obvious requisite for a practitioner is the facility of recognizing a disease when he sees it, of distinguishing it from others which resemble it, and of foretelling its probable course and termination. The treatment which he adopts will be judicious in proportion to the readiness with which he recognizes, and the accuracy with which he discriminates, the disease; and will be either rational or empirical, according as he does or does not understand its real nature and true cause. A practical work should furnish information to meet all these conditions of successful practice. Accordingly, the second part of this work will contain a description of diseases, their diagnosis and prognosis, their rationale, and their treatment, both rational and empirical, each of these principal topics being subdivided in a manner most convenient for reference.

3. But a facility of recognizing and discriminating diseases, a knowledge of their nature and causes, of their ordinary course and termination, and of the treatment most proper to be adopted, though essential to sound and successful practice, are not the only qualifications for it. There is a vast amount of information of a truly practical character which does not find a place in formal descriptions of individual diseases, though comprising all the particulars just adverted to. Such descriptions must be regarded merely as abstracts of the leading features observed in the ordinary run of cases, with an occasional notice of the more remarkable exceptions to the rule; but age, sex, and original and acquired peculiarity of constitution, give rise to differences in health, or habitual departures from it, which in a remarkable manner affect the severity and even the character of diseases. Hence a knowledge of the mode and degree in which both health and disease are affected by difference of age, sex, and constitution, whether original or acquired, is not less essential to safe and success-

ful practice, than is a special description of diseases themselves.

4. The list of the necessary acquirements of the practical physician, however, is not yet complete. It often happens that, at the bedside, great importance attaches to an individual symptom, and questions occur in relation to it which are not, and can not be, answered in the short space devoted to the description of the disease of which it forms a part. It may be common to several diseases, or it may be a question whether, though assumed to be a symptom of disease, it be not compatible with health. Moreover, there are many symptoms or signs of disease which are detected only by very close examination, and by the use of instruments or of chemical tests; and in using these instruments and applying these tests, many precautions are necessary that are not easily borne in mind, and with regard to which the practitioner may often require to refresh his memory.

5. One other consideration suggests itself in this place. No man, whatever may be his pursuit, deserves the name of a practical man whose knowledge and resources are limited by the experience of those who have gone before him. In all employments, and in none more than in the practice of medicine, new events and rare combinations are continually presenting themselves, which can only be understood and successfully encountered by the aid of general principles. Hence the necessity for the physician of a knowledge of physiology, pathology, and therapeutics, which supply the general principles that are to guide him in treating cases of disease, or complications of which he has no previous experience.

6. For all these requirements of the practical physician, provision is attempted to be made in these pages; the first part of the work comprising all those topics which have been last mentioned, while the second part is devoted to what is usually known under the title of the Practice of Medicine.

7. A physician who is well versed in all these particulars may lay claim to the title of *learned* in its best sense; if he have made this knowledge his own by diligent observation at the bedside, and by the constant use of instruments and application of tests, by which alone the value of symptoms can be determined, he will have earned for himself the name of *experience*; and if to learning and experience he unite the faculty of prompt and ready use of the knowledge which he has acquired, he is truly a *practical physician*.

8. A very wide and comprehensive meaning is here given to the terms *learning* and *experience*, and to the phrase *practical physician*. Indeed, it is of the first importance that these words should not be used in a low and vulgar sense. It is

too much the custom to call a man a practical physician because he gives no time or attention to any thing but the routine duties of his profession, and to deny him that title if he devote his leisure to what are termed scientific pursuits, even though these pursuits should be in immediate connection with, and have a direct bearing upon, practice. A strong conviction that no man is truly practical who is not also possessed of an extensive scientific knowledge of his profession, has presided over the preparation of this work, and has induced the author to extend it beyond the limits usually assigned to a so-called practical treatise.

9. If the foregoing considerations are well founded, there can be no difficulty in indicating the subjects which should find a place in a practical work. Such a work should obviously combine the special and the general; the former comprising all the diseases which fall under the care of the physician, the latter all the knowledge which has a practical bearing upon the treatment of disease; the one is the subject of the second part of this work, the other of the first.

10. Employing the term *practical* in the sense just attached to it, it is proposed to divide the first part into chapters, under the following titles: 1. *Health and Disease*, comprising such general observations upon either as shall seem to have the most practical bearing; pointing out the way in which both are varied by age, sex, temperament, and mode of life; and concluding by an explanation of the terms in most common use for distinguishing diseases from each other, and giving precision to our views and statements concerning them. 2. *Outline of Physiology and General Pathology*. In this chapter those facts and theories which have the most direct bearing upon the practice of medicine are brought together, and briefly stated, all unnecessary discussions being carefully avoided; and the more important and minute details being reserved for, 3. *Examination of some of the more important Symptoms and Signs of Disease*, comprising the blood, the urine, the viscera of the abdomen and of the chest, the pulse, and respiration; and, 4. *An Outline of General Therapeutics*, which will comprise such general principles as have been laid down for the treatment of disease, with a classification of the principal remedies, their doses, &c.

CHAPTER I.

ON HEALTH AND DISEASE.

11. HEALTH admits neither of definition nor description ; of none, at least, which can be applied to any useful purpose. If we define it as the integrity of every structure, and the perfect and harmonious play of every function, we give a true definition, but not a useful one. The more lengthened description in which some physiologists have indulged answers no better end, for it establishes no standard of comparison, and that is what we are in want of. Perfect health, like perfect beauty, is, perhaps, an ideal compounded of the perfections of many different individuals ; or, if it exist, it falls to the lot of few, and its phenomena have met with no accurate description.

12. Health, in its more usual acceptation, is a variable condition, and differs widely in different persons, and in the same person at different times. The terms "*perfect*," "*good*," "*strong*," "*robust*," "*feeble*," "*delicate*," &c., applied to health, show how generally this difference in degree is recognized. In strict propriety of language, perhaps, there is but one condition of the human body to which the term health can be applied, all others being departures, more or less wide, from that condition ; but for practical purposes, it is well to understand that there may be very great and marked departures from the ideal standard of perfect health, to which, nevertheless, the terms disorder or disease would be inapplicable.

13. The differences now alluded to are differences in degree of health—such differences as may exist in the same person at different times, or in persons bearing the closest external resemblance to each other ; but there are also differences in kind, which correspond more or less closely to peculiarities of external form, and indicate a tendency to particular diseases, or to a peculiar character attaching to all the diseases to which the party may become subject. These differences have been long recognized under the name of *temperaments* : a term necessarily wanting in precision, but, like many others in common use among medical men, embodying a useful generalization.

14. Four temperaments are generally recognized : the *sanguine*, the *phlegmatic*, the *bilious*, and the *nervous*.

15. The *sanguine* temperament is characterized by moderate plumpness of person and firmness of flesh. The hair is

red or light chestnut, the eyes blue, the complexion fair and florid, and the skin soft and thin. The blood-vessels are large, the circulation active, and the pulse full and frequent. The countenance is animated, the movements quick, the passions excitable, the mind volatile and unsteady.

16. The *phlegmatic* temperament is distinguished by roundness of form, softness of the muscles, and repletion of the cellular tissue. The hair is fair, the eyes light blue or gray, the skin pale, and the lips fleshy. The blood-vessels are small, the circulation languid, and the pulse infrequent. All the functions, bodily and mental, are torpid.

17. The *bilious* temperament is recognized by moderate fullness and much firmness of flesh, with harshly-expressed outlines of the person, strongly-marked features, and decided expression of countenance. The hair is black, the eyes and the complexion dark. The pulse is full, firm, and of moderate frequency. There is much energy of character, with great power of endurance and permanence of impressions, physical and mental.

18. The *nervous* temperament is distinguished by a small, spare form, delicate features, with thin upper lip, slender muscles, quick movements, pallor of countenance, and feeble health. The pulse is frequent and quick, and easily excited by mental emotions or nervous impressions. The whole nervous system, including the brain, is active, the senses are acute, the thoughts quick, and the imagination lively.

19. A *melancholic* temperament is sometimes spoken of. It is nearly allied to the bilious, and is marked by peculiar calmness and seriousness of mind, with a great tenacity of impressions, and a tendency to indulge in gloomy thoughts.

20. Pure specimens of these temperaments are rarely met with. They are usually so combined that it is difficult to say which predominates.

21. Each of these temperaments is liable to a different class of diseases: the sanguine, to acute inflammation and active hæmorrhages; the phlegmatic, to congestions and sub-acute inflammation, to glandular and tubercular diseases; the bilious, to disorders of the digestive organs; and the nervous, to mania, hypochondriasis, and melancholia.

22. Among the peculiarities of form and appearance here enumerated under the title of temperaments, there are some which claim a greater share of attention as indications of natural strength or weakness, and of liability to particular classes or characters of disease. Thus, *cæteris paribus*, the large chest is an indication of vigor; the small chest, of weakness; the thin lip, marked features, and small joints, of

tone ; the full upper lip, rounded features, and large joints, of constitutional debility.

23. There are also particular combinations generally met with in certain diseases or classes of disease, which combinations have received the name of *diatheses*. For instance, a fair complexion, fine hair, of different shades from light to dark chestnut, a blue or gray eye, long eyelashes, with a thick upper lip, is a combination very frequently met with in persons affected with scrofulous diseases ; and the same combination, the thin upper lip being substituted for the thick, is as commonly met with in consumptive patients. The former may be termed the *strumous* or *scrofulous*, and the latter the *phthisical* or *consumptive* diathesis. They are very closely allied, and are probably but very slight modifications of one and the same diathesis.

24. But, in addition to the external differences which, under the names of temperament and diathesis, distinguish one man from another, there are others of still greater importance, which are often revealed to us by no outward marks, but ascertained only by inquiry ; namely, tendencies to diseases transmitted from parent to child, and known as *hereditary predispositions*. These exercise a very wide influence in the production of disease. There are, indeed, very few persons who can boast of being entirely free from them. The extent to which they are likely to prevail may be judged of from the resemblance which most persons bear to their parents or ancestors. A strongly-marked feature, a deformity, or a peculiarity of temper or talent, is often transmitted through several generations. The thick lip of the imperial house of Austria, the irritable and unbending temper of the family of Mirabeau, and the cruelty of the Claudian race are examples in point ; and the transmission of supernumerary toes and fingers is a familiar instance of hereditary deformity. The morbid tendencies which are most frequently handed down from father to son are those to scrofulous affections, pulmonary consumption, and gout : asthma, stone, gravel, hemorrhoids, &c., may also be mentioned among hereditary predispositions. There can be no doubt that if the several functions of the body were carefully observed in members of the same family, these also would be found to be subject to the same influence.

25. Hereditary diseases, as distinguished from hereditary tendencies to disease, are of comparatively rare occurrence. A very small number of children, for instance, are born with tubercles in the lungs. The occurrence of syphilis in infants whose mothers, at the time of birth, labored under that disease, must not be regarded as an exception to this rule, as in

this case the disease is not, strictly speaking, hereditary, but communicated by contact.

26. An important practical inference may be drawn from what has been now stated concerning temperaments and diatheses, and the powerful influence of hereditary predisposition, viz., that we must expect to encounter at the bedside a vast variety of constitutions and many different degrees of vigor; and that our treatment of disease must necessarily be influenced by our knowledge of these differences.

27. Temperament, diathesis, and hereditary predisposition, then, constitute the most marked and prevailing differences between man and man; but there are other differences of more rare occurrence, and limited to comparatively few individuals, which are known by the name of *idiosyncrasies*. Familiar examples of these peculiarities are the severe and almost poisonous effects produced in certain persons by the most common articles of diet. Fish, fruit, vegetables, and meat, usually accounted perfectly wholesome, create in such persons marked disorder of the digestive organs, accompanied sometimes with painful cutaneous eruptions. A still more remarkable class of idiosyncrasies consists in the inversion of the characteristic effects of medicines. Thus, instances have occurred in which opium has acted as an aperient, and common epsom salts as a narcotic. Another important class of idiosyncrasies is characterized by the extreme effects produced by medicines. Some persons, for example, are salivated by a single small dose of the preparations of mercury; others can not take opium or its preparations, in any quantity, without unusual inconvenience.

28. Besides the differences arising from temperament, hereditary predisposition, and idiosyncrasies, which differences may exist between males or females of the same age, other and very important differences depend upon sex and age.

29. *Sex.*—The constitution of the male differs materially from that of the female, and this difference is strongly marked in the diseases to which each sex is liable, irrespective of those which attack the organs of generation, or which spring out of the peculiar functions that the female has to perform. In the constitution of the male there is more tone, more strength, more rigidity, and, as a natural consequence, a greater proneness to inflammatory affections; females, on the other hand, have more sensibility and excitability, and a more lax and delicate fibre, with a strong tendency to nervous affections, and to diseases of an asthenic character. The sexual functions of menstruation, parturition, and lactation, and their cessation, exercise a very marked influence upon the health of the female, especially in the production of nervous disorders.

30. On referring to a table founded upon nearly 20,000 cases of disease treated as in or out patients of King's College Hospital, I find that while the two sexes are nearly equally liable to febrile affections, the contagious exanthemata, diseases of the skin and of the bones, and to tumors, the males are more liable to rheumatism, gout, apoplexy, paralysis, mental disorders, diseases of the lungs, of the heart and arteries, of the urinary organs, of the organs of sense, and to inflammation; and females to catarrhal affections, dropsies not dependent upon organic disease, convulsive and neuralgic affections, diseases of the stomach and bowels, and intestinal worms. It is obvious, at a glance, that the diseases to which males are subject are of a more fatal character, an inference that is confirmed by the longer life enjoyed by the female. Were it not for the deaths in child-bed, and fatal diseases of the generative organs of the female, the mortality of that sex would be considerably less than that of males, and the excess of females existing in most countries and districts, whether civic or rural, would be greatly increased. The most important practical considerations connected with sex are, the greater liability of males to inflammatory and sthenic diseases, and of females to asthenic and nervous disorders. These considerations must exercise an important influence upon treatment; for, as a general rule, if a male and female are attacked by the same disease, the former will bear depletion and other antiphlogistic remedies better than the latter.

31. *Age.*—There are several important practical considerations connected with age. The gradual, and often imperfect, establishment of the function of respiration, and the consequent necessity of external warmth, after birth and during infancy; the disturbance produced by teething; the liability to disorders of the stomach and bowels, on the one hand, and of the brain on the other, corresponding to the larger size of the abdomen and head, the activity which characterizes the functions of digestion and assimilation, and the opening faculties of the mind, are familiar to all medical men. Diarrhœa, tabes mesenterica, intestinal worms, and serofulous affections of the absorbent glands, are the diseases resulting from the activity of the organs of digestion and assimilation; convulsions and hydrocephalus, from the large development of the brain; and pneumonia completes the list of the more frequent and fatal diseases of infancy and childhood.

32. The disproportionate size of the head and abdomen generally disappears from infancy to childhood, and from childhood to youth. During the latter period, accordingly, the liability to the diseases just named diminishes, and in their place others of a less fatal tendency make their appearance.

The disorders of the alimentary canal are not only less frequent and less fatal, but they react less severely upon the brain and nervous system. Intestinal irritation ends less frequently in hydrocephalus, and the involuntary movements of chorea take the place of the more formidable convulsions of infancy. These involuntary movements are of more frequent occurrence in the female than in the male, and the former continue liable to them up to a later period of life. They acknowledge as their most common cause the same intestinal irritation which gives rise to the convulsions of infancy. Another class of diseases of common occurrence in childhood and early youth is that of the exanthematous fevers, to which persons of tender age are peculiarly liable, although it is obviously difficult to compare them in this respect with adults.

33. Toward the period of puberty, the disproportion between the head and abdomen and the rest of the body has nearly disappeared, and by the twenty-first year the growth is nearly complete, no material alteration in the external appearance of the body taking place, though the process of ossification is not yet finished. The twenty-fourth year, or, according to Quetelet, the twenty-seventh, is the period at which the body attains its full growth. In the male, the interval which elapses between puberty and the period at which the body attains its full growth is marked by a considerable immunity from the diseases of the first periods. Disorders of the alimentary canal and of the nervous system are of rare occurrence, but idiopathic fever and inflammatory affections are frequent; and scrofula, which had previously shown itself in the form of enlarged glands and *tabes mesenterica*, now assumes the shape of pulmonary consumption. In the female, in addition to the diseases which attack the male, those which depend on the imperfect establishment or suppression of the menstrual discharge are rife during the first part of this period. Of these, anæmia is the most common; but chorea and epilepsy, melancholia and instinctive mania, are occasionally to be traced to the same cause.

34. From the twenty-fourth or twenty-seventh year to the forty-fifth or fiftieth year, the body remains nearly stationary, with the exception of an increasing disposition to corpulency. During the first part of this period, idiopathic fevers, inflammatory affections, and pulmonary consumption are rife; but toward the fiftieth year, congestion begins to take the place of inflammation, and apoplexy is superadded to the diseases just mentioned. In the female, the interval from thirty-five to fifty is marked by the cessation of the menstrual discharge, and the strange group of nervous affections which often accompany the change of life.

35. From fifty to sixty years, the body begins to show symptoms of loss of power, and sluggishness of function, the prelude to that slow decay of which the progress is marked by diminished sensibility, impaired memory, muscular weakness, scanty secretions, calculous affections, osseous deposits, organic diseases of the principal viscera, and malignant degenerations.

36. It is important to understand that, as there is great difference in the duration of life of different nations and individuals, so there are very marked differences to be observed between persons of the same sex who have attained the same age. These differences are best illustrated in the female by the variable time of occurrence of certain constitutional changes characterized by the appearance or suppression of the menstrual discharge. Observations on a very extended scale have shown that while the most usual age for the first appearance of the menses is 15 years, that event may happen at any age from 8 years to 25 years; and in very rare instances it has occurred in the very first year of life. So, also, with the period of suppression of that discharge. It may disappear at any age from 35 years, or even earlier, to 56 years, or later. This is adduced as an illustration of a fact important in practice, that the same age in different persons does not represent the same degree of growth, or the same perfection of function.

37. Another very important consideration in regard to age is that which relates to the fatality of the same disease at different periods of life. As age advances, the structures of the body undergo changes which render them more and more prone to disease, at the same time that they lose the power which they possess in so marked a degree in early life, of self-restoration. Hence the great simplicity of the diseases of childhood compared with those of more advanced periods of life, and the success attendant upon their treatment.

38. The fact now stated is well illustrated by the mortality of fever at different ages. It is well known that fever is a disease which, in by far the majority of cases, proves fatal, by setting up inflammation in some of the more important organs of the body, as the lungs, the bowels, or the brain. The mortality from fever may, therefore, be expected to keep pace with, and to be a measure of, the liability of the several organs of the body to fall into a state of disease, and to increase as the power of self-restoration diminishes. Calculations, founded by Mr. Finlaison on the experience of the London Fever Hospital, yield the following important results. If we suppose 100,000 patients to be attacked with fever, at each

of the ages specified in the following table, the mortality will be represented by the figures in the column of deaths.

Age.	Deaths.
5 to 16	8,266
15 to 26	11,494
25 to 36	17,071
35 to 46	21,960
45 to 56	30,493
55 to 66	40,708
66 and upward	44,643

From this table it would appear that the risk to life from fever increases very rapidly with age. Thus, it is nearly twice as great at 31 as at 11, at 41 as at 21, at 61 as at 41; nearly five times as great at 61 as at 11; and nearly four times as great above 65 as at 21. Similar results have been obtained for the febrile exanthemata, which, like fever, originally affect the whole body, but in their progress attack individual organs.

39. The liability to sickness, and the duration of it when it occurs, also increase with age. This will appear from the following table, which is altered from a valuable abstract by Mr. Neison, of the results of an extensive series of returns from English and Scotch Benefit Societies.

Age.	Per centage of Members sick during each Year.	Sickness per annum among those actually sick, expressed in Weeks.	Mortality per cent. among those actually sick.
11-15	21.9	4.1	1.0
21-25	22.0	3.8	3.1
31-35	21.0	4.4	3.8
41-45	23.0	5.9	4.5
51-55	27.6	8.5	6.2
61-65	35.6	15.2	8.6
71-75	58.4	32.3	12.1
81-85	74.5	37.8	18.4

40. The individual differences just pointed out—temperament, diathesis, hereditary predisposition, sex, and age—are still further extended and exaggerated by climate, place of abode, habit and mode of life, and the almost innumerable influences which, especially in civilized life, are brought to bear upon human beings at every period of their existence. Some of them will require especial notice, in consequence of their bearing on practice.

41. The most powerful of all the agents that affect the condition of the body while in health, and which, therefore, modify its diseases, is the atmosphere. This not only affects the entire surface of the body by variations in its temperature, pressure, and hygrometric and electric condition, but, by its contact with the skin and internal surface of the lungs, is the means of producing the most important and extensive chemical changes in the state of the blood, and through it of the system at large. A variety of subtle poisons, of which some are

eliminated from inorganic matter, others generated by the decomposition of animal and vegetable matter, and a third class given off from diseased living bodies, are also held in suspension in the air. All of these, in a state of concentration, may give rise to fatal accidents, or to severe diseases; but when diffused in smaller quantity through the air, they modify the state of health, and impair the tone of the system. Other substances—such as smoke, dust, and metallic particles, diffused through the atmosphere, during certain chemical or mechanical operations—also tend to impair the function of the skin and lungs, and may become the source of fatal diseases.

42. The temperature, moisture, pressure, and electric condition of the air, variously modified and blended, constitute *climate*, of which the effect upon the frame is marked in the form and features of the body, as well as in the condition of its several functions.

43. The contamination of the air by noxious gases and particles of smoke and dust is a most efficient cause of modifications in the state of health, as well as a prolific source of disease. The pure air of rural districts is subject to contamination by the exhalations from stagnant pools and marshes, which, when they do not produce actual disease, have a morbid influence on the general health of the inhabitants. But the air of large towns is subject to still greater pollution from the gases given off from the body itself, from the decomposition of animal and vegetable substances, from the refuse of manufactories, from the smoke produced by the imperfect combustion of fuel, and the dust created by constant traffic.

44. These impurities in the air of large towns, existing both within and without the dwellings of their inhabitants, tend to modify the state of health of those who are reputed healthy, and to render them liable to a class of diseases distinguished from those of rural districts by an absence of power or tone, no less than by the different and even opposite treatment which they require. Thus, a disease which in the country will bear and require blood-letting, will, in large towns, scarcely admit of any amount of depletion, and may even demand an opposite mode of treatment. This depressing and debilitating effect of the atmosphere of large towns, displayed in the pallid aspect of those who are esteemed healthy, and in the want of power accompanying the diseases to which they are subject, is a fact of great practical importance, and one which ought always to be borne in mind at the bedside.

45. The debilitating effect of a residence in large towns is most remarkably shown in that class of the inhabitants which follows its employments within doors, and which, in addition to the impure air of the town itself, is exposed to the close

and heated atmosphere of shops and workshops. These persons exhibit, in an exaggerated form, the peculiar influence of a town life, and their diseases are marked in a still greater degree by want of power. There is as much difference between the in-door and out-door laborers of large towns as there is between the inhabitants of the town and of the country. A difference of a less marked kind is also to be observed between those who lead a sedentary life within doors, and those whose in-door employments require a greater amount of exertion. A residence in large towns, then, tends to reduce the strength and vigor, and predisposes to diseases characterized by want of tone and power; and this effect is more marked in persons employed within doors than in those working in the open air, and in the sedentary than in those using greater exertion.

46. The injurious effects of the polluted atmosphere of large towns may be inferred from the excessive mortality of their inhabitants as compared with that of rural districts. Thus, while the annual mortality of rural districts in England and Wales is little more than 2 per cent., or about 1 in 49, that of town districts, not being the seats of manufacture, is $2\frac{1}{2}$ per cent., or 1 in 40; and that of the manufacturing towns, $3\frac{3}{4}$ per cent., or one in 28. Manchester, which is the most unhealthy of the manufacturing towns, loses every year $3\frac{1}{2}$ per cent. of its inhabitants; while Anglesey, which is the most healthy of our rural districts, loses little more than $1\frac{1}{2}$ per cent. The high mortality of Manchester is even surpassed by that of Liverpool; and there are parts of all large towns which present a still higher mortality than the average of Liverpool itself. The diseases which cause this high mortality are, in accordance with what has been just stated, the scrofulous affections of children, and the pulmonary consumption of the adult, together with febrile diseases and exanthemata, characterized by an unusual tendency to the typhoid or adynamic form. The dust and smoke of large towns, suspended in the air, also give rise to diseases of the lungs, which exist in their most severe and fatal form among the knife-grinders of Sheffield.

47. *Habit and mode of life* also exercise a marked influence on the health, and on the character of the diseases to which men are subject. An insufficiency of nourishment is one of the most influential causes of that want of power and tone which has been pointed out as marking the inhabitants of large towns; but a still more fatal influence is the abuse of spirituous liquors, to which the inhabitants of large towns are peculiarly addicted. Its effect on the health is seen in the pallid and sodden aspect of the drunkard, and its influence on

the character and course of disease in the fatal effects so often attending the slightest injuries in the brewers' draymen and others addicted to habits of intemperance. This fact, too, has a practical bearing on the treatment of disease : for persons given to intemperance bear depletion even worse than other inhabitants of large towns, and often require the opposite mode of treatment. This statement, also, is borne out by a fact, to which I have elsewhere drawn attention, that in men peculiarly exposed to the temptation of drinking, the mortality from consumption before 35 years of age is twice as great as in men following similar occupations, but less liable to fall into this fatal habit.

48. Luxury, too, like intemperance, tends to undermine health and shorten life. Hence the higher orders, as has been recently shown, are short-lived, and, we may therefore safely infer, unhealthy while they live. The agricultural laborers are much longer-lived than any of the higher classes ; and the aristocracy are nearly on a par with the members of benefit societies in Liverpool, the unhealthiest city in England. Of the classes, too, which enjoy the most ample means of self-indulgence, those are the most unhealthy which possess these means to the greatest extent. Thus, the clergy are more healthy than the gentry ; the gentry, than the aristocracy ; the aristocracy, than the members of royal houses ; and these last more healthy than crowned heads. Those who occupy the highest place in the social scale are probably, in point of health and longevity, but little raised above the very meanest of their subjects.

49. The general result of the foregoing considerations respecting health and the differences which exist between one individual and another, may be thus summed up : There are many original and many acquired differences between man and man. The original differences are those conveyed by the terms temperament, diathesis, hereditary predisposition, and idiosyncrasy ; to which we may add those dependent upon sex and age. The acquired differences are due to climate, place of abode, employment, and mode of life. In speaking of age, it is important to understand that the same age does not imply the same degree of growth or development ; and that even those functions which would seem to be most important to the health and vigor of the frame, present a wide latitude in the time of their appearance and disappearance.

50. When, therefore, we take into consideration the original and acquired differences which distinguish man from man, and the various and complicated influences to which the body is exposed in all states of society, but especially in highly-civilized communities, no additional argument will be necessary

to establish the first great principle on which much of the practice of medicine hinges—that in health and (by natural inference) in disease every function of the body varies within wide limits of intensity. This fact is the key to the imperfection of medicine as a science and its difficulty as an art.

51. *DISEASE*.—To define disease we must first have defined health, for the one is but the negation of the other. In like manner, the description and right understanding of disease depends upon the description and right understanding of health. Without attempting a formal definition of disease, it will be sufficient to state, that disease is present when any structure of the body is changed (provided that change be not the direct and immediate effect of external injury), or when any function is either unnaturally active, or torpid, or altered in character. As we can not say that any structure is changed, unless we know what that structure was in health, nor that any function is disordered, without a previous knowledge of the natural condition of that function, it is obvious that an accurate acquaintance with structural anatomy and physiology is a necessary preliminary to the study of disease. We learn the healthy structure of the body by dissection, the healthy condition of the functions by observation. On this latter point our information is extremely imperfect, and many difficulties lie in the way of our obtaining it; nor is its importance yet fully recognized.

52. Diseases vary much (*a*) in their mode of occurrence, (*b*) in the causes which produce them, (*c*) in their duration and course, (*d*) in their type or form, and (*e*) in their nature. The following are some of the terms corresponding to these differences:

53. (*a*) *Epidemic*.—Attacking a number of persons at the same time, and recurring at irregular intervals; as fever, small-pox, cholera, &c.

Endemic.—Peculiar to certain localities, as ague, goitre, &c. The same disease may be both epidemic and endemic: thus, typhus fever is epidemic and endemic in certain districts of large towns. Cholera, again, is endemic in India, and epidemic in Europe.

Sporadic.—Attacking one individual at a time. In this sense the term is sometimes applied to epidemic and endemic diseases, attacking one or two persons only, in which case they are said to occur *sporadically*.

54. (*b*) *Contagious and Infectious*.—These terms are now used synonymously to designate diseases communicated from one person to another.

Hereditary.—Transmitted from parent or ancestor to offspring or descendants.

55. (c) *Acute*.—Of short duration and great severity.

Chronic.—Of long duration and slight severity.

These may be combined, as in intermittent fever, which is *chronic* in duration, and *acute* in severity. Again, one may run into the other, the acute subsiding into the chronic, and the chronic being heightened into the acute. In one instance, the terms *acute* and *chronic* have been incorrectly used to mark merely the severity of disease; thus articular rheumatism or rheumatic fever is called *acute rheumatism*, and rheumatism of the muscles is called *chronic rheumatism*.

56. (d) *Continued*.—Running their course without interruption in their symptoms.

Intermittent, or *Periodical*.—Interrupted by intervals of health.

Remittent.—Having an alternate augmentation and diminution of their symptoms.

(e) *Structural*.—Consisting in some alteration of structure.

Functional.—Consisting in disordered function.

Common.—Presenting the more usual characters of common inflammation, &c.

Specific.—Peculiar, or departing from that character. Thus, syphilis and scrofula are specific diseases.

Malignant.—Structural diseases for which no remedy has yet been discovered, and which spread from texture to texture; as cancer.

57. *Names of Diseases* (medical nomenclature).—No uniform plan has hitherto been pursued in giving names to diseases. By far the greater number have been named from some prominent symptom; as fever (from *ferreo*, to burn), hydrophobia, diabetes. Other diseases have been named from their seat, as hydrocephalus; or from their seat and nature combined, as pericarditis, pleuritis, iritis, the root indicating the part affected, and the termination *itis* denoting the nature of the disease, viz., inflammation. Recent attempts have also been made to substitute for words in common use more philosophical terms descriptive of the nature of the existing disease. Thus, it has been proposed to substitute the term hyperæmia (excess of blood), qualified by the words general, local, active, passive, &c., for plethora, inflammation, and congestion; and anæmia (defect of blood), similarly qualified, for chlorosis, &c. To many of these innovations it may be objected that it is yet premature to use words which imply an accurate knowledge of morbid conditions, and that for some time to come it will be better to continue the use of those terms with which the profession is most familiar.

58. *Classification of Diseases* (Nosology).—The same objection applies to all philosophical systems of nosology which lies

against innovations in the use of terms, viz., that we are not yet prepared to construct a philosophical system. Almost all the systems hitherto proposed have rested upon some theory, which is now disallowed, and they have been attended with the usual inconvenience of all hasty and premature generalization—the inconvenience of associating dissimilar things, and separating those which are closely and naturally allied. Cullen's nosology illustrates this inconvenience in almost every page. The arrangement adopted in the present work is such as to bring the diseases of the same parts together, whereby the student and practitioner will have the advantage of comparing and contrasting one with another.

59. There are some considerations connected with disease in general which are of far higher importance than the use of terms, or the adoption of a correct nomenclature and classification. These will be treated of under the heads of (a) causes, (b) symptoms and signs, (c) diagnosis, (d) prognosis, and (e) treatment.

60. (a) *Causes of Disease* (Etiology).—Many verbal distinctions are in use in respect of the causes of disease, but the division most generally recognized is into *proximate* and *remote*.

Proximate Causes (Causæ abditæ, continentes, occult causes).—This term has arisen out of the twofold meaning of the word disease. If a disease happens to be named from the part which it attacks, and the nature of the change that part is undergoing, as pericarditis, or inflammation of the pericardium, the proximate cause is the disease itself; if, on the other hand, the name is but the representative of a group of symptoms, as cough, dyspnœa, hectic fever, emaciation, &c.—the symptoms of phthisis—then the term proximate cause means the suppurating tubercle which gives rise to all these symptoms. But if we are ignorant of the seat of a disease, as is the case with fever, the search after a proximate cause is but an inquiry into the real nature of the disease.

Remote Causes (Causæ evidentes).—All constant antecedents of an event are called *causes* of that event, and all constant consequences of an event are called *effects* of that event. Hence the same thing may have many causes. Thus an hereditary taint, intemperance or want, and a common cold may exist in the same person as causes of pulmonary consumption. The hereditary taint may have rendered the person more liable than others to the formation of tubercles, intemperance or want may have occasioned their actual deposition, and the cold may have excited the dormant tubercle into activity. Now all these are *causes* of consumption, and the consumption may become the cause of death. How, then, are such causes to be distinguished from each other?

They are divided into *predisposing* and *exciting*. In this instance the *predisposing* causes are the hereditary taint and the mode of life, the *exciting* cause is the cold, and the *proximate* cause (if the term must be used) the suppurating lung. The condition of the body itself, however it may be brought about, is the *predisposing cause*, or the reverse, of any disease which may befall it ; the *exciting causes* are external agents of various kinds, as cold, heat, &c. These external agents are also among the most powerful *predisposing* causes. Thus, that combination of external influences which we call climate is the predisposing cause of a great variety of diseases ; and any one of the elements of which it consists may become an *exciting cause*.

61. (*b*) *Symptoms and Signs of Disease* (Symptomatology, semeiotics).—All lesions of structure, whether the consequence of external injury or of internal change, cause some disorder in the functions of the body ; and almost every disorder of one function leads to derangement in those which are most closely connected with it. These disordered functions are called *symptoms*. Thus, pain, cough, and difficulty of breathing are symptoms. Groups of symptoms also, if they have a name, become compound symptoms. Thus, fever is a symptom of inflammation.

The term symptom is variously qualified in medical writings. Thus, we have *anamnestic* symptoms, or those which relate to a patient's previous state of health ; *diagnostic*, or those which distinguish his disease from others ; *prognostic*, or such as enable us to predict the event of his disease ; *pathognomonic*, or those which are peculiar to his malady, and to that alone ; and *therapeutic*, or such as indicate the treatment to be adopted.

62. But we have also *signs* of disease, and the word *sign* has not precisely the same meaning as the term symptom, though the two terms are sometimes used without much discrimination. The difference between them will be best shown by an example. Cough, expectoration, dyspnoea, hectic fever, night sweats, and emaciation are *symptoms* of pulmonary consumption, but they are not *signs*, for each of them may occur in other diseases ; but cavernous respiration and pectoriloquy are signs. So, also, expectoration is not a *sign* of consumption, but a symptom, for it occurs in many other diseases of the chest ; but a certain kind of sputa is stated to be a *sign* of that disease. From this it would appear that *signs* are merely pathognomonic or diagnostic symptoms. There is, indeed, nearly the same difference between a symptom and a sign as between a character and a characteristic. Redness, pain, increased heat, and swelling are symptoms,

or characters, or phenomena of inflammation ; but redness and increased heat are, at the same time, symptoms and signs, characters and characteristics ; pain and swelling are merely symptoms.

63. The term *physical* sign is in common use among medical men : it means a sign which is an object of sense. Thus, heat, redness, and swelling are physical signs of inflammation, pectoriloquy of phthisis, coagulable urine of disease of the kidney.

The first duty of the physician is the interpretation of symptoms : this he effects by careful examination. If, for instance, a patient complains of pain in the chest, he proceeds to ascertain whether that pain is external or internal, and, if internal, what is its precise seat. If, again, a patient void urine different from that of health, he submits it to chemical analysis, that he may find out the exact nature of the change which it has undergone, and trace that change to its source. By thus weighing the value of every symptom, he learns what the disease is, what its severity, what the treatment to be adopted, what the hope of recovery. His success will greatly depend on the method of examination which he adopts. Some of the more important methods will be described in a future chapter.

In the observation of disease, the physician should be prepared to encounter one great difficulty, viz., the variation of the same symptom in different cases, and the occasional absence even of those symptoms which, when present, are most characteristic. Thus, a frequent pulse is among the most striking symptoms of consumption, but cases sometimes occur in which the pulse does not exceed its average number in health. In these cases, it is true, the number of beats may be really greater than it was in the same person in sound health, but, by our ignorance of that number, we lose the benefit of the symptom. This same symptom of increased frequency of pulse is among the most constant and characteristic attendants on fever, and yet in some epidemics the pulse has been unusually infrequent. These anomalies meet the physician at every turn.

64. (c) *Diagnosis*, or the discrimination of diseases, is the necessary prelude to the treatment of disease. It is the first duty which the physician has to perform at the bedside, and every thing depends on the way in which he discharges it. A correct observation and just appreciation of symptoms are essential to a true diagnosis. Diagnosis, indeed, may be said to be the art of converting *symptoms* into *signs*. The first impression which the patient makes on the physician is always an important element in the diagnosis ; in most cases

it enables him to determine whether he is suffering from a slight or a severe illness, and, in many instances, to decide at once upon the nature of the complaint. Thus, anæmia, pulmonary consumption, Bright's disease, fever, pneumonia, and severe disease of the heart are often so strongly marked on the very countenance of the patient as to leave no doubt in the mind of the experienced physician; and many other diseases, such as chorea, gout, and rheumatic fever, several of the exanthemata, and skin diseases in general, betray themselves by single symptoms which are decisive of their nature. The diagnosis in such instances is very simple; but the task of the physician becomes one of considerable difficulty when the disease is either imperfectly developed, as in the first stage of eruptive fevers and in incipient phthisis, or when the only obvious symptom is one which may depend on several causes, as is the case with dropsy; and it is still more difficult when the nature of the complaint must be inferred chiefly from the description which the patient gives of his own sensations, or from a mere perception of the size and shape of a part of which the structure is concealed from view, as happens with the greater number of tumors. These are the cases which put the knowledge and skill of the physician to the test, and which sometimes baffle both. In some instances it may be necessary to wait till the characteristic symptoms show themselves; in others, to make minute examinations by means of the stethoscope; in others, to apply chemical tests to the urine, or to call in the aid of the microscope; and in a few, to confess our ignorance. The effects of remedies, as of blood-letting and stimulants, will also, in rare instances, serve as a means of diagnosis. The symptoms which render us the greatest assistance in distinguishing one disease from another will be carefully examined in a future chapter.

65. (*d*) *Prognosis*.—The meaning of this term is foreknowledge, and, as used by the physician, it means the anticipation of the course and event of diseases. The power of foretelling the progress and termination of a malady is of the first importance, not only as regards the treatment to be adopted, but as respects the comfort and well-being of the patient and his friends, and the reputation of the physician himself. A correct prognosis implies a just diagnosis, an accurate knowledge of the natural course and progress of diseases, an appreciation of all the peculiarities, original and acquired, which distinguish one man from another (*see sec. 11-50*), and experience of the power and mode of operation of remedies. It must be obvious, from this statement, that the art of prognosis is one of unusual difficulty, and that it ought, for the sake both of the physician and his patient, to be exercised with

discretion and caution. The subject is too extensive to be fully treated in this place, but it may be well to point out and illustrate one or two of the leading questions which the physician may be called upon to solve. One of the most frequent is, whether the disease admits of cure. The answer is sometimes very easy. A case of hydrophobia, on the one hand, or of hysteria, on the other, presents no difficulty. The one is as certainly fatal as the other is curable. But in a case of tetanus, of pneumonia, or of pulmonary consumption the prognosis offers greater difficulty. The first would be most probably fatal; the second is always attended with danger, the amount of which will chiefly depend upon the sex, age, temperament, and previous habits of the patient; the third is fatal in a very large majority of cases, and the probability of ultimate and complete recovery is very slight. This latter disease offers a very good example of the necessity of caution in forming and stating our prognosis. Pulmonary consumption is incurable, and medicine, at the best, is but palliative; but if in every case of pulmonary consumption a physician were to foretell a fatal result, his reputation would suffer severely, for the simple reason that consumption, though ultimately fatal in nine hundred and ninety-nine cases out of a thousand, is not necessarily fatal in any given attack, recoveries even from several successive attacks being by no means unusual; and this happens, not because the disease is curable, but because its fatality depends upon the extent of tubercular deposit. This fact forms the true explanation of the asserted efficacy of medicines and of change of climate. The degree of danger attending a disease, its probable course, the complications which result from its continuance, its probable duration, its tendency to recovery—these are among the questions which are likely to present themselves, and which are every day applied as tests of the physician's knowledge, experience, and judgment.

66 (*e*) *Treatment*.—A correct diagnosis, a knowledge of the nature of the disease itself, of the constitution of the sufferer, and of the virtues of remedies are essential preliminaries to judicious treatment. The object which the physician proposes to himself will vary with each case. In one case it will suffice to remove the ascertained cause of indisposition; in another it will be necessary to restore the altered function or diseased structure; in a third we can merely hope to palliate the suffering or inconvenience which the disease occasions. Our treatment will sometimes be founded on a correct knowledge of the nature of the disease and the mode of operation of our remedy, in which case we are said to pursue a *rational* treatment; in other instances we act in ignorance of both,

and then our treatment is said to be *empirical*. Again, our treatment may be *cureative*; that is to say, it may restore the patient to perfect health; or merely *palliative*—in other words, adapted to the alleviation of suffering. The abstraction of blood in inflammation is an example of *rational* treatment, for we understand both the condition of the part affected and the *modus operandi* of the remedy. The use of quinine or arsenic in ague is merely *empirical*, for we understand neither the nature of ague nor the mode in which these medicines affect the body in curing it. The treatment of pulmonary consumption is necessarily *palliative*, for, from the very nature of the complaint, it is obvious that it does not admit of cure. Such, also, is the case with a large proportion of neuralgic affections, and with malignant diseases. In the treatment of many diseases we combine the rational with the empirical, and the curative with the palliative; thus, during an attack of remittent fever, we sometimes have recourse, in turn, to blood-letting to subdue local inflammation, to cold sponging to diminish the heat of the surface, to stimulants to counteract existing debility, and to quinine to effect a cure of the disease.

67. The considerations brought forward in this chapter will serve to show the extreme difficulty which attends the practice of medicine, and the necessity imposed on the physician of supplying himself with very extensive and precise information on all the subjects which can conduce to a knowledge of the human body, on the one hand, or of the virtues of remedies, on the other. By such a combination alone can the art of healing be raised from the low level of a conjectural to the dignity of a rational art.

68. But, after all that can be done, the science of medicine must remain extremely imperfect, and the art extremely difficult. Our general knowledge, derived originally from particulars made up of many variable elements, must be reapplied in practice to individual instances as complicated as those out of which they were originally formed, so that precision is, in the nature of things, impossible, and certainly of very rare attainment. It is not unimportant that this truth should be understood and acknowledged.

CHAPTER II.

PHYSIOLOGY AND GENERAL PATHOLOGY.

69. THE human body may be regarded as a machine, not less remarkable for the finished workmanship of its parts and the consummate skill with which they are put together, than

for its complexity. In these respects it resembles, at the same time that it infinitely surpasses, the most perfect works of men's hands ; but it stands alone in this, that it contains within itself the means of ministering to its own growth and preservation, and, within certain limits, of repairing the many injuries to which it is exposed. It draws its supply of materials from without, appropriates to its own use almost every form of organized matter, and converts it by a subtle chemistry into blood. This fluid is distributed through the entire frame, nourishing, vivifying, and stimulating every part ; the system of vessels by which it is conveyed, and the heart by which it is circulated, forming not the least remarkable portion of its mechanism. The blood, once circulated through the frame, becomes unfit for the nourishment of the body or the support of its life, till it is restored to its state of purity by exposure to air in the lungs.

70. But the change produced in the blood by the contact of air, though it be the most striking, is by no means the only one which it undergoes in its circulation through the body. A variety of noxious ingredients derived from the food itself, or from the effete textures of the frame, are separated from the blood by appropriate organs, and expelled, at the same time that the functions of nutrition and secretion are going on in every part of the frame.

71. In the performance of these several functions, the solid structures of the body are in incessant action, its fluids in perpetual motion, and both in constant change. The means by which all this is effected are more remarkable than the fact of its taking place. A power, of the nature of which we are profoundly ignorant, whose center is the brain and spinal cord, and whose instruments are the nerves, presides over all these motions and changes, regulates, controls, and harmonizes them, and so adapts itself to the varying conditions of the frame, as almost to seem endowed with discretion and volition as well as power.

72. Lastly, this wondrous fabric is the abode and material instrument of a mind, by which it is brought into connection with the external world and exposed to all those varied influences which make one race of men to differ from another, and each individual from his fellows.

73. The intimate connection which exists between the several parts of the frame, and the close dependence of one function upon another, is even more remarkable than the multiplicity of its parts, and the variety of functions which it performs. If the heart ceased to circulate blood, or the lungs to purify it, the nervous system would no longer send forth those influences by which the heart beats and the chest breathes.

If, on the other hand, the nervous centers suffer severe injury, respiration is prevented, and the heart ceases to beat. External influences also, on whatever part of the frame they act, affect not that part only, but through it other organs, and through these the entire body. Again, the mind affects the body, and the body reacts upon the mind, and both together form a being so intricate in structure, and so complex in function, that the continuance of his life and the maintenance of his health appear a constant miracle. But the perfection of this machine is equal to its intricacy; and thus it happens, that while the one provides under favorable circumstances for the free play of all its parts, the other exposes it under unfavorable ones to serious derangements of function and alterations of structure.

74. Thus, then, the human body consists of a fluid with appropriate organs for its elaboration and purification; a system of vessels for its distribution throughout the frame; solid structures to be formed, maintained, and renewed; a ruling power presiding over every action of the solids, and every motion and change in the composition of the fluids; and an organ of the mind, the instrument by which its mandates are conveyed to, and its workings take effect upon, the body. The contents of the present chapter, arranged in the order which this recapitulation suggests, will, therefore, be as follows:

1. The physiology and general pathology of the fluids, including digestion, chylicification, sanguification, and excretion.

2. The physiology and general pathology of the circulating organs, considered as instruments for the distribution of the blood.

3. Structural pathology.

4. The physiology and general pathology of the nervous system.

5. The mind; considered more especially in its relation to the body.

1. PHYSIOLOGY AND GENERAL PATHOLOGY OF THE FLUIDS.

75. *Digestion.*—All organized matters are capable of being digested. Having been divided and trituated by the teeth, and moistened by the saliva, they are conveyed to the stomach, where they are submitted to the action of the gastric juice, and converted into chyme.

76. The time required for this operation varies in different persons, and in the same person at different times and under different circumstances. The chief causes, irrespective of the state of the stomach and its secretions, which affect the duration of the process are, the quantity, quality, and degree of division of the food itself, the quantity of the liquid with which

it is mixed, and of the saliva. The quantity of liquid taken with the food is of great importance, as its removal by the absorbents of the stomach is necessary to fit the mass for digestion. The influence which the quality of the food has on the time required for digestion has been shown by the experiments of Dr. Beaumont, from which it appears that animal food is more rapidly digested than vegetable, the meat of full-grown animals than that of young animals, fresh meat more readily than salted. Roast and boiled meats seem to require nearly the same time. Another circumstance which influences the duration of this process is repose of body and mind. **Exercise and anxiety both retard it.**

77. Digestion is in part a chemical process, the gastric juice acting out of the body as well as in the stomach. An artificial digestive fluid may be made by soaking the mucous membrane of the stomach in dilute muriatic or acetic acid. This fluid, at a temperature of 99° to 100° Fahr., converts food into a substance closely resembling chyme.

78. All food, whether animal or vegetable, may be resolved, according to Dr. Prout,* into four classes, or groups, of staminal principles—the *aqueous* (water), the *saccharine* (sugar, vinegar, starch, gum, &c.), the *albuminous* (the proximate principles of animals, and vegetable gluten), and the *oleaginous* (oils and fats). Neither of these principles taken alone will support life, and no substance which constitutes the food of the more perfect animals consists of less than three, if not four of them. Milk, the nourishment provided by nature for the young of animals, is a compound of all these principles.

79. The food received into the stomach undergoes two changes, which have been termed by Dr. Prout *reduction* and *conversion*: the one consists in the formation of a homogeneous pulp; the other is a chemical action by which the several staminal principles are converted into substances similar to those which enter into the formation of the blood. In the healthy stomach, both these processes are perfectly performed; but in disease, one or both are liable to derangement.

80. The *reducing* power of the stomach may be increased, while the *converting* power is diminished. In these cases, large quantities of food are taken, but the body remains thin; the products of digestion pass off by the bowels, or in rare instances entering the blood, are discharged unchanged by the urine. On the other hand, the reducing power of the stomach may be diminished, giving rise to various forms of dyspepsy. If the converting power at the same time remain intact, the patient may gain flesh; if it be diminished, he grows thin. The reducing function of the stomach may be impaired by

* On the Nature and Treatment of Stomach and Urinary Diseases.

over-repletion, by the excessive use of liquids, especially those of a stimulating kind, by injudiciously prolonged abstinence, or by the abuse of condiments.

81. The *concerting* power of the stomach may be unusually active, in which case the food is rapidly converted into nourishment; or it may be lost in respect of all the principles, in which case the body ceases to be nourished; or it may extend to one only of those principles, and thus lay the foundation for serious disease.

82. The want of power to assimilate one or other of the staminal principles may often be traced to hereditary predisposition, and to those causes which impair the general power of the stomach.

83. Little is known of the mal-assimilation of the aqueous principle, but the mal-assimilation of the saccharine and albuminous principles leads to effects both strongly marked and severe.

84. The mal-assimilation of the saccharine principles (*viz.*, sugar and vinegar, starch, lignin, and gum) causes the formation of sugar, which finds its way into the blood and urine in diabetes mellitus; of oxalic acid, which, combined with lime in the urine, constitutes the oxalate of lime, or mulberry calculus; and of lactic acid, which abounds in rheumatic and hectic fevers, and is probably the principal ingredient in the acid liquors rejected from the stomach in dyspepsy.

85. Mal-assimilation of the albuminous principles (albumen, gelatine, fibrin, and gluten) may lead to an excess of albumen, conveyed into the blood and eliminated by the kidneys, and to the formation of lithic acid and cystic oxyd calculi; the mal-assimilation of the allied gelatinous principles leads to an excess or deficiency of urea, or of its equivalent, the carbonate of ammonia.

86. The mal-assimilation of the oleaginous principle leads to a deficiency of fat in the frame, or leanness: an unusual power of assimilating this principle, to corpulence.

87. These forms of mal-assimilation are inferred to exist, not so much from the analysis of substances rejected from the stomach, or contained in that organ after death (though sugar has been found in the stomach in excess in cases of diabetes), but from discovering the products of such mal-assimilation in the blood and urine.

88. The chyme formed in the stomach, passing into the duodenum, is mixed with the bile and the secretion of the pancreas; the acid of the chyme is neutralized by the alkalies of the bile, and other changes take place which are not well understood. The chyme is separated into two portions, chyle and excrementitious matter; the chyle is taken up by the

lacteals; the excrementitious matter, mixed with the chief ingredients of the bile, passes through the intestinal canal, and is ejected as fæces. The bile and the indigestible portions of the food form the natural stimulus to the motions of the intestinal canal; an excess of bile increases the peristaltic action, a deficiency of it causes constipation. In like manner, an excess of excrementitious, and especially of ill-digested, matters produces diarrhœa; the absence of all indigestible matter from the food tends to cause constipation. This is one of the evils of an over-refined cookery.

89. The fæces form but a small proportion of the entire ingesta, and consequently of the egesta. In Dr. Dalton's experiments, ninety-one ounces of ingesta yielded only five ounces, or about one eighteenth part of fæces. The quantity of this excretion, however, varies greatly in different persons, and in the same person at different times, and has also a close dependence on the quantity of indigestible matter taken with the food.

90. The biliary secretion stands alone in being formed from blood which has already served other purposes in the economy—the blood of the vena portarum. This vein, deriving its blood mainly from the intestinal canal, suffers distention whenever the coats of the intestines are unusually loaded with blood. Hence the secretion of the bile depends upon the supply of blood from the intestines, and the state of the intestines is, on the other hand, influenced by the quantity and quality of the biliary secretion.

91. Of mal-assimilation in the duodenum, little is known. If the chyme contains an excess of acid, the bile is unable to neutralize it, and the food, in its passage through the intestines, gives rise to serious disorders of the first passages.

92. Of the two portions into which the chyme is separated, viz., chyle and excrementitious matter, the chyle is absorbed by the lacteals, and conveyed into the thoracic duct, where it is mingled with the lymph collected from every part of the body by the absorbents, and the mixed fluid is then poured into the venous system, and becomes a part of the blood. This mixed fluid, of which the most important ingredient is albumen, in its course through the lacteals undergoes changes by which it is approximated to the character of the blood. The absence of these changes is supposed to be one cause of disease, leading in children to obstruction of the mesenteric glands, and, at more advanced periods of life, to the deposit of an imperfect albumen mixed with fatty or earthy matters, constituting serofulous matter, tubercle, and gouty concretions.

93. To the changes which the food undergoes from its first reception into the stomach till it is mingled, in the form of

chyle, with the blood, Dr. Prout has given the name of *primary assimilation*. The changes which take place in the capillary vessels during the formation of new parts, the conversion of the effete structures of the body into lymph, and those which the lymph itself is presumed to undergo in its passage through the absorbent system, have been called *secondary assimilation*. A few words in reference to this latter process will complete the present outline of the means by which the constant waste of the circulating fluid in secretion and nutrition is repaired.

94. The precise nature of the changes which take place in these minute parts can not be determined by direct observation, but must be inferred from the composition of the blood, on the one hand, and the composition of the various excretions, on the other. In the formation of the several secretions and structures of the body, many ingredients of the blood, such as fibrin, albumen, salts, &c., must be removed, and the blood itself must be returned to the heart robbed of a portion of its chief constituents. In the destruction of the effete and useless parts of the frame, on the other hand, there is reason to believe that many new principles are formed which are destined for removal by the excreting organs, and which, if not so removed, act as subtle poisons, and give rise to serious diseases. But the blood may be tainted, not merely by the accumulation of these matters in it, but by the formation of others still more injurious, in consequence of *secondary mal-assimilation*.

95. The principal structures of the body are the albuminous and the gelatinous. The *albuminous* structures, which in health are resolved into lithate of ammonia, when mal-assimilated give rise to lithic acid gravel, and perhaps to certain combinations of cyanogen, which act as subtle poisons. During this imperfect assimilation, certain organic diseases of the albuminous tissues are supposed to arise.

96. The *gelatinous* tissues, which in health are resolved into lactate of urea, when mal-assimilated are converted into sugar and urea, or into oxalic acid and urea, the urea being replaced in either case by carbonate of ammonia. The mal-assimilation of these textures also leads to certain diseases of the skin, and to destructive suppuration of the cellular tissue. The sugar eliminated by the kidneys constitutes diabetes mellitus; and oxalic acid, combining with lime, forms the mulberry calculus.

97. This outline of the processes of primary and secondary assimilation must be received with reserve, as a theory undoubtedly true in some parts, and a fair inference from observation; but in any case as suggestive of useful reflections and important inquiries, and sure to lead, even if only par-

tially true, to practical results, by laying a broad, and probably not insecure, foundation for a sound humoral pathology.

98. The food has now been traced through the processes of digestion, chymification, and chylification, to its commixture with the mass of the circulating fluid. How the milk-white contents of the thoracic duct become converted into red blood, we are ignorant; the fact of their being so changed is all we at present know. The next subject for examination is the blood itself.

99. *The Blood.*—This fluid furnishes the materials for the formation, nourishment, and growth of every part of the body, and contains within itself the elements of its several tissues, and all the new elements into which these tissues are resolved when no longer fit to form a constituent part of the frame.

100. The quantity of blood contained in the adult body is variously estimated at from 8 to upward of 30 pounds. Valentin estimates it at $34\frac{1}{2}$ pounds for the male, and 26 pounds for the female, when both have attained their maximum weight.

101. Its color is bright red in the arteries, and dark red in the veins. It is fluid when circulating within the living textures, but coagulates in from three to seven minutes after its removal from the body. It consists of red particles or globules, to which it owes its color, and a transparent and colorless fluid, which consists of serum holding fibrin in solution, and which has received the name of *liquor sanguinis*.

102. The blood, when it coagulates, separates into two parts, the *crassamentum*, or clot, and serum. The clot is formed by the coagulated fibrin enveloping the red globules and a portion of the serum: its consistence, therefore, depends upon the relative quantity of these constituents. When the fibrin is large in proportion to the other constituents, the clot is firm; when it contains much serum, it is loose.

103. The quantity of the *crassamentum* (the combination of the fibrin and red globules, with a variable proportion of serum) varies within wide limits. The blood of men contains, according to Lecanu, nearly 33 parts more of the chief constituents of the *crassamentum*, viz., fibrin and red globules, than that of women: in the sanguine temperament they are also more abundant than in the lymphatic.

104. The number of the *red particles* evidently differs in different persons at different times, and it probably varies with age, sex, temperament, and state of health. According to the researches of Bequerel and Rodier, the quantity by weight varies from 113 to 152 parts in a thousand, the aver-

age for healthy males being 141 parts, and for healthy females 127 parts.

105. The proportion of *fibrin* in healthy blood varies from $1\frac{1}{2}$ to $3\frac{1}{2}$ parts in a thousand, the average being $2\frac{1}{2}$. It is more abundant in arterial than in venous blood, in about the proportion of 5 to 4.

106. The *serum* is a straw-colored fluid, holding albumen in solution. On the application of a temperature of 167° Fahr., this coagulates, and the fluid which remains is called the serosity. The serosity consists of salivin, casein, lactic acid, and ozmazome, with salts (principally of soda) dissolved in water.

107. The quantity of the several constituents of the serum varies in the two sexes, at different ages, and in different temperaments. The quantity of water is greater in females than in males; in children and aged persons than in persons of middle age; and in the lymphatic temperament than in the sanguine. In healthy males it has a range of from 760 to 800 parts in a thousand, and an average of 779; and in healthy females a range of 773 to 813, with an average of 791. The quantity of albumen ranges from 62 to 75 parts in a thousand, the average being about 70 parts.

108. In addition to the parts now mentioned, the blood contains a variety of principles in minute quantity, which are destined to be removed from the body by the various excreting organs, especially by the kidneys. When these secretions are checked from any cause, the materials which ought to have been removed from the body accumulate in the blood, and may be detected by chemical reagents.

109. The blood is supposed to have an independent principle of life. The best argument in support of this view is the fact that blood is developed in the ovum previous to the formation of vessels. Whether this be the case or not, the blood exercises a most important influence on the functions of all the organs of the economy, nor can its composition be materially changed without serious consequences to health.

110. The blood undergoes various changes in disease. These consist (*a*) in certain sensible changes; (*b*) in variations in the relative proportions of its constituent parts; (*c*) in the admixture of certain substances foreign to its composition in health.

111. (*a*) *Sensible Changes*.—The quantity of blood is increased in plethora, and of course diminished in cases of hæmorrhage and after long abstinence. It is also said to be diminished in anæmia, but it is probable that the pallor of the surface which characterizes that disease is occasioned by a deficiency of coloring matter. Its temperature is increased in

many diseases accompanied with a rapid circulation, as in severe inflammations and inflammatory fevers : on the other hand, it is diminished in languid states of the circulation, and especially in disorders accompanied by imperfect decarbonization of the blood, as cyanosis. The *color* of the blood is more florid in diseases accompanied with a rapid circulation, as in acute inflammations and inflammatory fevers : on the other hand, in languid states of the circulation, in diseases severely affecting the respiration, in cases where the whole of the blood does not circulate through the lungs (cyanosis), the blood assumes a darker hue. In advanced stages of fever, and in the cholera, the blood is not only of a darker color, but otherwise materially changed from its usual state. The mode in which the blood *coagulates* is commonly regarded as an indication of disease, and a guide to treatment ; as such it will be considered in the next chapter.

112. (*b*) *Variations in the relative Proportions of its constituent Parts in Disease.*—The quantity of the *clot* depends upon the degree of contraction of the fibrin, being greater where the fibrin contracts feebly, less where it is strongly contracted. It is also greatly influenced by the shape of the vessel into which the blood is drawn, and by many other causes. The *red particles* are in excess in plethora, and in defect in anæmia. They are more slowly reproduced than the other constituents of the blood ; hence the long continuance of pallor after hæmorrhages. The *fibrin* is increased in acute inflammations, especially of the serous membranes, in acute rheumatism, pneumonia, phthisis, erysipelas, cynanche tonsillaris, absorbent inflammation, &c. The greatest increase takes place in acute rheumatism, in which disease it is sometimes nearly three times as great as in health, and continues in excess after repeated bleedings. It is also in excess in the pregnant female. On the other hand, the quantity of fibrin is diminished in fevers which are not inflammatory, in cerebral congestions and hæmorrhages, in scurvy, in profuse hæmorrhages, and in inflammation of the mucous membranes. The quantity of the *serum* increases as that of the *clot* diminishes. The quantity of *water*, in like manner, increases as that of the more solid ingredients decreases. It is in excess in anæmia, and in chronic diseases accompanied with great debility. The quantity of the *albumen* probably bears a near proportion to that of the fibrin : it is greatly diminished in cases of Bright's disease. The *salts* of the serum are unusually small in quantity in typhoid fever and in cholera morbus.

113. To these facts, which are stated chiefly on the authority of Andral and Gavarret,* the following table of the

* Annales de Chimie et de Physique, Nov., 1840.

variation observed in the quantity of the chief constituents of the blood in disease, with the average in health, according to these authorities, may be added :

Fibrin varies between	10.5 and	0.9 per 1000 parts ;	average in health	3
Globules	185	21		127
Solid matters of serum	114	57		80
Water	915	725		790
Inorganic matters of serum	8	5		8

114. It is worthy of remark, that those states of system in which fibrin exists in unusually large proportion in the blood are precisely those in which the cupped and buffed appearance of the blood is most strongly marked, and in which there is the greatest tolerance of the loss of blood. These conditions are acute rheumatism and acute inflammation, especially of the serous membranes ; and pregnancy.

115. (c) *Admixture of Substances not found in the Blood in Health.*—These are of four kinds : 1. The results of mal-assimilation of the food. 2. The elements of the natural secretions and excretions. 3. Morbid secretions of the blood itself ; and, 4. Poisons introduced from without.

116. (1) The only substances not naturally contained in any of the secretions or excretions, and which result from mal-assimilation in the stomach, are sugar and oxalic acid ; of which the former has been detected in the blood in very considerable quantities, and the latter, though it has not yet been detected, may be presumed to exist in it, as it is found in combination with lime in the urine.

117. (2) The elements of the secretions and excretions accumulated in the blood in consequence either of disease of the proper excreting organs, or of the excessive production of those elements during primary and secondary assimilation, are chiefly the following : urea, fatty matter in excess, coloring matter of the bile, cholesterine, free carbon, and casein.

118. (3) Of the morbid secretions of the blood itself, the chief is pus, which, under certain circumstances, is absorbed from suppurating surfaces, and carried into the circulation.

119. (4) Almost all poisons introduced into the stomach, by wounds or by the unbroken skin, find their way into the blood, and may be detected there by appropriate tests. Among vegetable substances may be mentioned alcohol, hydrocyanic acid, camphor, opium, indigo, and rhubarb ; among animal substances, musk ; among minerals, arsenious acid, barytes, lead, copper, mercury, and silver. To these may be added iodine, ferrocyanate, and nitrate of potass, &c.

120. The various constituents of the blood are separated from it, and thrown out among the textures of the body, or on the surface of membranes, or discharged by its several out-

lets. Of these, fibrin plays an important part in every process of reparation; water and serum are formed in the sacs of the serous membranes and in the cellular tissue, the red globules escape in peculiar states of debility, while in cases of inflammation, accompanied by loss of substance, a new fluid is formed, viz., pus.

121. The chyle and lymph which are continually added to the blood bring with them many useful and some hurtful principles, which must be excreted from the body. The organs by which this is effected are the lungs, the skin, the kidneys, and the liver.

The Lungs.—The blood arrives at the lungs of a dark red, and leaves them of a bright red color. This change was formerly attributed to the elimination of carbonic acid gas, but its true cause is at present a subject of dispute. According to the lowest estimate, the quantity of the gas formed in twenty-four hours amounts to 14,930 cubic inches, or 8534 grains; according to the highest, 39,600 cubic inches, or 18,612 grains. The mean of the three estimates (Lavoisier and Seguin, Davy, and Allen and Pepys) is nearly 28,736 cubic inches, or 14,985 grains. The quantity of carbon removed from the blood will, therefore, be, according to the lowest estimate, 2820 grains; according to the highest, 5148; and the mean of the three estimates will give 4273 grains, or nearly ten ounces avoirdupois.* This estimate falls short by a quarter of an ounce of that given by Dr. Dalton.†

122. Air once respired contains nearly 6 per cent. carbonic acid; but, however frequently the same air is breathed, it never contains more than 10 per cent. The respired air is diminished by about one twenty-fourth of its volume. This decrease is probably owing to the absorption of oxygen. When pure oxygen is breathed, the quantity of carbonic acid given off from the lungs is increased.

123. Dr. Prout's experiments show that the quantity of carbonic acid generated in a given time is greatest between 11 A.M. and 1 P.M.; smallest between 8½ P.M. and 3½ A.M. It is, therefore, less at night than during the day. It is also less in females than males, in young and old than in middle-aged persons. It is increased by repletion and exercise, and lessened by fasting and rest. It is also diminished by depressing passions, by fatigue, by spirituous liquors, tea, or vegetable food, or by the long-continued use of mercury. Carbonic acid is also given off in larger quantity when the barometer is low, and it is greater for low than for high temperatures.

124. Besides carbonic acid, water is exhaled in large quantity from the lungs. In twenty-four hours this amounts to

* See Müller's Physiology, vol. i., p. 308.

† See sec. 147, and seq.

nearly 8000 grains, or considerably upward of 1 pound avoirdupois.

125. The chief function of the lungs, then, is to free the blood of carbonic acid and water. It is not yet ascertained in what part of the body the carbonic acid is formed : all that we know is, that its separation from the blood is necessary, to enable that fluid to act as the efficient stimulus to all the functions of the frame, and to minister to its growth and nourishment. The suspension of respiration for a few minutes is fatal to life, and the circulation of blood not purified by respiration exercises an injurious influence on all the organs of the body, but particularly on the nervous system.

126. Some interesting observations by Dr. McGregor show that the quantity of carbonic acid exhaled from the lungs is greatly increased in the first stage of small-pox, measles, and scarlatina, as well as in various chronic diseases of the skin. As these diseases decline, the quantity gradually returns to its normal condition.

127. The *Skin* performs functions of great importance in the economy ; for it not only separates from the blood substances which would be injurious if retained in it, but also regulates the temperature of the body by the evaporation from its surface. The chief constituents of the cutaneous exhalation are water and carbonic acid. To these may be added nitrogen, ammonia in combination with lactic acid (according to some, with acetic acid), osmazome, and a variety of salts.

128. The quantity of carbon eliminated by the skin in twenty-four hours amounts, according to Dr. Dalton, to a quarter of an ounce, being a very small fraction of that given off from the lungs. Sometimes carbonic acid is exhaled with nitrogen, sometimes nitrogen alone is given off, and at others neither of them is present. The quantity of these gases also varies considerably ; but it appears that nitrogen is most abundant after animal food, and carbonic acid after vegetable food. The quantity of these gases is increased by food and by muscular exertion.

129. The total exhalation from the skin amounts, according to the estimate of Dr. Dalton, to 6½ ounces in twenty-four hours. The more accurate experiments of Seguin give 7 grains per minute in a male in a state of rest, which would amount in twenty-four hours to little less than 1½ pounds avoirdupois. This quantity is certainly much too high for the entire day, though it is the result of careful experiments made for a short period.

130. The aqueous exhalation is partly mere evaporation, and partly a secretion. The evaporation is affected by common physical agents ; the secretion is increased by these and

by internal causes, as by excitement of the circulation, provided that excitement does not rise too high. On the other hand, it is diminished in a state of complete rest.

131. The quantity of the cutaneous exhalation is increased by a dry and warm atmosphere, by air in motion, and by diminished pressure of the atmosphere: it is lessened by moisture, by stillness of the air, and by increased atmospheric pressure.

132. The perspiration is *diminished* when other secretions are greatly increased: thus, the skin is dry in diarrhœa, diabetes, cholera, dropsy, &c. The perspiration is also diminished in the cold stage of intermittent and continued fevers, and at the commencement of all febrile affections. In these cases the secretion is deficient, from the small quantity of blood circulating through the vessels of the surface. On the other hand, whenever the quantity of blood is greatly increased, as in acute inflammations, in the hot stage of fever, and in the febrile exanthemata, the same result follows.

133. The secretion is *increased* in the sweating stage of intermittent fevers; in continued fevers of the less severe kind; in catarrhal and miliary fevers; and in inflammatory affections, when the febrile symptoms are not very severe. In these cases, the quantity of blood sent to the skin is increased, but falls short of that which exists in the hot stage of fever. The secretion is also increased when determination of blood to the skin is combined with debility of the capillaries, as in hectic fever, especially in that which attends phthisis pulmonalis, in puerperal fever, &c. In extreme debility, again, the perspiration is augmented in consequence of the debility of the capillary vessels, though the quantity of blood circulating through those vessels is diminished. Such are the cold sweats which precede dissolution.

134. The *odor* of the perspiration, which is naturally sour, is heightened in catarrhal, rheumatic, and arthritic diseases, in childbed affections, and in intermittent fevers. In mania and in pulmonary consumption it sometimes has an unusually offensive odor. This acid odor is due to the increase of acetic and lactic acids.

135. Sweats are sometimes partial, as in phthisis; sometimes general, as in the sweating stage of fevers. General sweats are commonly preceded by partial ones.

136. The effect of remedies on the secretion of the skin is well known, some acting by diminishing the violence of the circulation when it is too rapid, others by increasing the action of the heart when the circulation is too languid. The passions of the mind also affect the exhalation from the skin, by exciting or depressing the heart's action.

137. *The Urine*.—This secretion removes from the body water, some effete animal matters, as urea and lithic acid; certain saline matters; and various foreign substances which have entered the circulation. In quantity, it amounts to more than half the solid and liquid ingesta.

138. Its most important constituents are water, urea, and lithic acid. These latter ingredients consists of the following elements:

	Nitrogen.	Carbon.	Oxygen.	Hydrogen.
Urea contains	47	20	27	7
Lithic acid	31	40	27	2

139. A glance at this table will show that urea and lithic acid contain a very large proportion (urea nearly fifty per cent.) of nitrogen, and that they are the principal means by which this gas is eliminated from the system. These elements vary much with the quality of the food. They are increased by animal, and diminished by vegetable diet. They are almost absent in infants at the breast, and go on increasing toward manhood.

140. The quantity of the urine is increased by the suppression of other secretions, and diminished by their increase. This increase and decrease are most observable when the cutaneous exhalation is affected. As the urine is a secretion which attracts particular attention at the bedside, it will be more minutely examined in the next chapter.

141. *The Bile*.—This secretion has already been considered in speaking of the process of digestion. As the greater part of that secretion is excrementitious, and is expelled from the body with the fæces, it claims no further notice in this place.

142. By the excretions which have now been examined (those of the lungs, skin, kidneys, and liver), the blood is freed from those matters which are either useless or hurtful. These excretions have been examined separately; but it will be useful to consider them collectively, and to show what share each bears in removing from the blood those ingredients which are poured into it from the thoracic duct, the joint product of the chyle and lymph, or, in other words, of the food and effete textures of the frame.

143. For this purpose, the experiments of Dr. Dalton may be employed. An average of fourteen experiments made on successive days in the month of March gave the following result, the urine and fæces being ascertained by weight, and the proportion of the secretion of the skin and lungs by calculation.

The quantity of ingesta amounted to 91 ounces. The egesta were as follows:

Urine, $48\frac{1}{2}$ ounces ; fæces, 5 ounces : exhalation from the lungs and skin, $37\frac{1}{2}$ ounces ; of which $30\frac{1}{2}$ ounces by the lungs, and $6\frac{1}{2}$ by the skin.

Thus it appears that of the whole amount of the ingesta, nearly one half was excreted by the urine, a third by the lungs, about a thirteenth by the skin, and an eighteenth by the bowels.

144. By far the largest proportion of these excretions, and, consequently, of the food and drink from which they may be considered as supplied, consists of water. In the whole 91 ounces, the quantity may be estimated at 76 ounces, and the water contained in the several excretions may be thus stated :

Urine, $45\frac{1}{2}$; fæces, $3\frac{1}{2}$; lungs, $20\frac{1}{2}$; skin, $6\frac{1}{2}$. Total, 76 ounces.

Thus it appears, that of the superfluous water contained in the blood, three fourths are removed by the kidneys, somewhat more than a fourth by the lungs, rather less than one twelfth by the skin, and about a twentieth by the bowels.

145. The separation of water from the body is evidently an important use of these excretions, and it is easy to understand how one of these organs may become vicarious of another in this respect. Thus, when the exhalation from the skin is increased by exercise or by any other cause, the urine is diminished ; when, on the other hand, as in diabetes, the quantity of the urine is increased, the skin becomes dry and harsh. The functions of the lungs and skin, in like manner, are closely connected. When during exercise the skin is moist, the respiration is free ; but if, the skin being dry, the circulation is at the same time excited, the respiration is difficult and frequent ; but the moment moisture breaks out upon the skin, the lungs are relieved as by a charm, the respiration becomes natural and easy, and the body is freed from the load which oppressed it. The pedestrian will recognize the truth of this statement.

146. The quantity of water removed by the bowels being comparatively small, has little effect on the other secretions ; but if increased by the operation of a purgative, the urine is diminished in quantity, and in violent diarrhœa is often entirely suppressed. The exhalation from the lungs is probably affected by the quantity of the secretions poured out by the other organs, but as that does not admit of measurement, no accurate statements can be made on this point.

147. Next to the water which is thus removed from the system, the most abundant material excreted is carbon. The proportion in which this substance is eliminated by the different organs may be stated as follows :

Urine, $\frac{1}{2}$ an ounce ; fæces, $\frac{1}{2}$ an ounce ; lungs, $10\frac{1}{2}$ ounces ; skin, $\frac{1}{2}$ of an ounce. Total, $11\frac{1}{2}$ ounces. A certain proportion

of the carbon contained in the fæces is furnished by the bile, a secretion extremely rich in carbon, containing, as it does, about eighty per cent. of it. The remainder of the carbon contained in the fæces has never formed a part of the circulating fluid. Hence the blood is purified of its carbon by the lungs, kidneys, skin, and liver. Of these organs, the lungs excrete by far the larger proportion; so large a proportion, that no single organ, nor all of them jointly, can supply the place of the lungs when their functions are much embarrassed.

148. The lungs and skin excrete carbon in combination with oxygen, forming carbonic acid; the kidney, in combination with nitrogen and oxygen, with a small proportion of hydrogen; and the liver, in combination with hydrogen, but with scarcely any nitrogen. As the carbon is similarly combined in the secretion from the lungs and skin, it is easily seen how the functions of the skin may become vicarious of those of the lungs. The relief afforded to the lungs during exercise by free perspiration, probably arises in part from the excretion of carbonic acid. The colliquative sweats in phthisis pulmonalis seem to point in the same direction.

149. The close relation existing between the functions of the liver and lungs is proved by the frequent co-existence of diseases of those organs: that the one may be vicarious of the other is shown by the large size of the liver in the fetus, as compared with its size in the adult.

150. The essential constituents of the urine (urea and lithic acid) contain carbon in considerable quantity. The formation of these substances in excess may depend upon disordered function of the lungs, as well as on mal-assimilation of the food in the *primæ viæ*.

151. Nitrogen is at one time absorbed, at another time exhaled by the lungs; it is exhaled by the skin in variable, but probably not in large, quantity; it is nearly absent from the bile, but the appropriate organ for its secretion seems to be the kidney. In what degree other excretions may be vicarious of the kidney in this respect is not yet known.

152. The secretions of the skin, of the kidneys, and of the liver, all abound in salts; one of these organs may, therefore, to a certain extent, become vicarious of another in removing these matters from the system.

153. In the similarity of the matters excreted by the several organs of the body, we can not but recognize a provision for maintaining the normal constitution of the blood under the less severe functional disorders of those organs. The efforts made by one organ to supply the place of another probably account for some of the more familiar symptoms of disease. When

these efforts are altogether unavailing, the constitution of the blood becomes seriously altered, and life itself is compromised. A careful study of the elements secreted by the several organs, can not fail to contribute much to the right understanding of disease.

154. The following table presents at one view the foregoing results of Dr. Dalton's experiments, the last three lines of the table being a rude approximation ;

	Pulmonary Exhalation.	Cutaneous Exhalation.	Urine.	Fæces.
Total egesta.	91 oz.	30½ oz.	6½ oz.	48½ oz.
Water.	76½ oz.	20½ oz.	6½ oz.	45½ oz.
Solid residue.	14½ oz.	10½ oz.	½ oz.	3 oz.
				1½ oz.

Consisting of substances containing

Carbon	11½ oz.	10½ oz.	½ oz.	½ oz.	½ oz.
Nitrogen and other gaseous elements of urea and lithic acid.				1½ oz.	
Salts, &c.				1 oz.	
Residue of undigested matters					¾ oz.

Having now examined the constitution of the blood, of the various materials out of which it is formed, and of the excretions by which it is freed from useless or hurtful matters, it remains to consider the mechanical arrangements by means of which the blood is renewed and purified, and subsequently distributed through the frame ; in other words, to examine the functions of absorption, secretion, nutrition, and circulation.

It will be convenient to examine these functions in the following order : the action of the heart ; the motion of the blood in the arteries ; the function of the capillaries of the veins, and of the absorbents.

2. PHYSIOLOGY AND GENERAL PATHOLOGY OF THE CIRCULATING SYSTEM.

155. *The Heart's Action.*—The heart is the center of two incomplete circulations ; one through the lungs, beginning at the right ventricle, and ending at the left auricle ; the other through the body, commencing at the left ventricle, and ending at the right auricle ; the two together forming a complete circulation, an uninterrupted stream of blood. A third circuit may be said to consist of the coronary arteries and vein, the former arising from the commencement of the aorta, the latter opening into the right auricle. The parts which compose this circle consist of arteries, veins, and intermediate capillaries, all of which are always, and in all states of the living body, full of blood.

156. The *heart* is the prime source of the circulation through the vessels. Expelling its contents, more or less frequently, in different persons, and in the same person at different ages

and under different circumstances, the ventricles send out at each contraction the blood which they have received through the auricles from the large venous trunks.

157. The quantity expelled at each beat in a healthy adult is estimated at about two ounces. The total quantity of the blood has been stated very differently by different authors: it is probably about thirty-two pounds (*see* sec. 100). Assuming this to be the quantity, and taking the pulse at 70, it is obvious that a given portion of blood could not complete its circulation through the body in less than three minutes and a half. Müller estimates the time required at from one to two minutes. Positive experiments, however, made by Hering on the horse, prove that the circulation may be completed in 25 or 30 seconds; and the still more accurate experiments of Mr. Blake on the same animal, show that it is completed in from 12 to 20 seconds. The experiments of the latter gentleman prove that in the dog the circulation may be completed in as little as nine seconds. In the same animal, the time required for a poison to pass from the jugular vein to the lungs was four seconds; from the jugular vein to the coronary arteries of the heart, seven seconds; from the jugular vein to the carotid artery, from five to seven seconds; and from the aorta to the capillaries, four seconds. The total estimated quantity of blood must, therefore, be too high, and the quantity expelled at each beat of the heart too low; or, what is perhaps as probable, the entire quantity of blood contained within the body is not constantly in the current of the circulation, but remains for a longer or shorter period in the capillary vessels, subserving the functions of secretion and reparation. The force with which the blood is expelled by the left ventricle has been estimated at somewhat more than four pounds.

158. *The Arteries.*—The blood sent out by the heart is distributed to every part of the body by the arteries. These are highly elastic tubes, admitting of expansion both in a transverse and longitudinal direction, and adapting themselves by contraction to the volume of their contents. With each contraction of the heart, they are both expanded and slightly curved. That they undergo a positive increase of size has been shown by the ingenious experiments of Poiseuille. In the carotid artery of the horse it amounted to $\frac{1}{23}$ of the capacity of the vessel. The larger arteries, by yielding to the impulse of the blood and reacting upon it, cause a delay in its motion which would not occur in the case of rigid tubes; hence the pulse is somewhat later in the arteries remote from the heart, than in those near to it. This same elasticity also equalizes the motion of the blood in the smaller vessels, and causes it to flow in a continued stream. It also accounts for

their empty state after death, the blood which they contain being forced into the veins. In old age this elasticity is lost by the ossification of the vessels.

159. The dilatation of the arteries can not be seen by the eye, and has been proved to exist only by the use of ingenious instruments. But the large arteries may be seen to throb. To what, then, is this throbbing due? To the longitudinal extension of the vessel with each beat of the heart. The vessel, in fact, is stretched and curved outward by the forcible injection of blood. If now the finger be applied to the vessel with a tolerably firm pressure, this effort at change of place is felt. But this is not all, for the pressure exerted by the finger is resisted by the blood forced into the artery at each beat of the heart, and this resistance is also distinctly felt. These two things together, the change of place which the artery undergoes, and the resistance to pressure offered by the blood injected by the heart, constitute the pulse, and these two elements of the pulse may be recognized by the careful observer. The pulse will be more minutely examined in the next chapter.

160. *The capillaries* are the smallest vessels in the body. They form a net-work, between the meshes of which the proper substance of each organ lies, and they establish a communication between the last divisions of the arteries and the commencement of the veins. The small arteries have no other termination, and the veins no other origin but this; and there are no vessels terminating by open mouths. The capillaries are distinct vessels with membranous parietes.

161. Microscopic observations have shown that the blood flows through the minute arteries and capillaries with a constant and equable motion. In young animals however, and in adult animals in a state of debility, the blood is accelerated with each pulse of the larger arteries; while in extreme debility the red particles have been observed to recede somewhat after each pulse. The motion of the blood in the capillaries is entirely dependent on the heart's action, its constant and equable flow on the elasticity of the arteries. The motion of the blood is less rapid in the capillaries than in the arteries, which may be explained by the great resistance offered by the capillaries themselves; a resistance calculated at from $\frac{2}{3}$ to $\frac{3}{5}$ of the force of the heart. It appears that all the red particles sent out by the heart traverse the capillaries, and are returned by the veins, none being arrested in the tissues, or contributing to nutrition.

162. The capillaries, as has been stated, are tubes with thin membranous parietes. These parietes contain contractile fibres, analogous to muscular fibres. In health, they perform

the important functions of nutrition and secretion ; in disease, they are the principal seat of those changes which we designate by the terms *inflammation*, *congestion*, &c. A knowledge of the real nature of these changes is of the utmost importance to the practitioner.

163. In health we are familiar with some marked changes which these minute vessels undergo, and these changes will enable us to understand disease. The emotion of shame causes the cheek to blush ; the emotion of fear blanches it. Warmth, generally or locally applied, produces redness of the skin ; cold, on the other hand, makes the skin pale ; exercise, likewise, reddens the surface, and continued rest restores it to its usual color. Now, the blush of shame, the redness produced by heat, and the glow from exercise are all examples of enlargement of the capillary vessels, and the consequent increase of the quantity of blood which they contain ; while the pallor produced by fear, or cold, or rest are examples of the opposite condition.

164. Here, then, we have three distinct causes of what is called determination of blood to the skin : in the first case, an emotion of the mind ; in the second, a local application to the capillaries themselves ; in the third, the increased action of the heart. From the first example it appears that the capillaries may be increased in size without any increased action of the heart ; for if it were due to that cause, the blush would not be confined to the cheek : the second shows that local applications will affect the capillaries in the same way, without disturbing the heart's action ; and the third proves that precisely the same result may follow from the stronger and more frequent contraction of the heart itself. The cases in which paleness of the skin occurs are equally instructive, proving, as they do, the local effect of emotion in contracting the capillaries, the equally local and direct effect of cold, and the remote effect of a tranquil state of the heart's action.

165. To return to the state of the capillary vessels when the color of the skin is heightened. That state is one of dilatation. How is that dilatation caused ? It has been stated that the capillaries possess a contractile property analogous to that of muscular fibre. There are but two ways, then, in which the enlargement of the capillaries can be explained, viz., the force of the heart's contraction, and the temporary relaxation of the contractile texture. In the last example adduced, that of the skin becoming red from exercise, the capillaries are obviously dilated by the additional quantity of blood forced into them by the heart ; but, in the first two cases, the cause is strictly local, and in no way dependent upon the heart's action. Here, then, we have examples of

the capillaries dilating without any force to fill them ; in the one case, in consequence of an emotion, in the other, of a local application. But this local application itself (heat) is of a nature to expand the substance, whether living or dead, to which it is applied ; therefore, the effect, in this case, may be regarded in the light of a mere physical change, and not as a proof of any vital expansion of the vessels. This being granted, there yet remains in the act of blushing an undeniable proof of a *vital* expansion of the capillary vessels ; an expansion that is peculiar to living beings ; the cause of this expansion, an influence conveyed through the nerves, the *modus operandi* of this influence, a momentary diminution or suspension of the contractility of those vessels.

166. It appears, then, that, in one instance at least, there is no other way of accounting for the enlargement of the capillary vessels than by a diminution or momentary suspension of their contractility. Now in inflammation this same enlargement of the capillary vessels occurs ; and the important question arises, Is it due to the same cause ? Take a simple case. A grain of sand gets into the eye, pain is produced, and in a short time the vessels of the conjunctiva become filled with red blood, and obviously enlarged. Here there is no action of the heart to account for the enlargement of the vessels, for the other eye, which is equally affected by the general circulation, is not inflamed. The change, then, is strictly local. It can not arise from the arteries leading to the inflamed part sending more blood into the small vessels, for any contraction of these arteries must have the effect of diminishing the quantity of blood passing through them to the inflamed part. What, then, can give rise to the dilatation of the capillaries but a temporary loss of their contractility, and what can account for this but an influence transmitted through the nerves to the coats of the vessels ? Suppose another case. A small piece of ice is applied to a finger. The immediate effect is to contract the vessels, but, as soon as the ice is removed, the pale skin becomes red ; redder than the surrounding skin. Here, again, the influence of the heart's action in injecting the capillaries is out of the question, and we have a strictly local effect produced, consisting in a contraction of the vessels, followed by dilatation.

167. The contraction of the capillaries, which is here produced by cold, has been shown, by experiments under the microscope, to follow on the application of all substances capable of producing inflammation, and to be succeeded, after a variable interval, by dilatation of the vessels. Hence the objection which might be urged against this example, viz., that the contraction is a mere physical effect of cold, loses its

force, and the general fact remains, that agents capable of exciting inflammation first act by contracting the capillaries, and that this contraction is followed by dilatation.

168. Can this be explained? Perhaps thus: It is a general law that all stimuli applied to any part of the body call that part into action for a time, and that that action is dependent upon nervous influence; but that nervous influence suffers exhaustion proportioned to its intensity and duration, and that exhaustion produces in the part affected a condition the very reverse of that which existed when the nervous power was in full force. Apply this to the case under consideration, and it will stand thus: The stimulant applied to a part determines the nervous influence to the capillaries of that part, and the function of those capillaries, viz., their contractility, is for the time called into full play, exhaustion ensues, and then that same function is paralyzed; in other words, the vessels lose their contractility, and yield to the blood which flows into them.

169. Microscopic observations have further shown that during this first period of contraction the flow of the blood is more rapid, but that when the vessels become dilated the circulation is retarded. It has also been shown that vessels which, in a healthy state, are too small to admit the red globules of the blood, now convey colored blood, and that the globules permeating the coats of the vessels find new channels for themselves in the surrounding textures.

170. Such are the changes which take place in the inflamed part; but they are not long confined to the capillaries, for the arteries leading to them, and the veins arising from them, suffer the same dilatation; and if the inflammation be severe and extensive, the larger arteries and veins themselves participate; and thus large portions of the body—a hand, a foot, a limb, or an internal organ—become one congeries of enlarged vessels. Of course, these vessels contain a much larger quantity of blood than those of the corresponding part of the body. Thus, if severe inflammation attack one hand, it contains much more blood than the other; the radial artery of that side is evidently enlarged; and if a vein of that side be opened, it pours forth much more blood than the vein of the opposite side.

171. The enlargement of the arteries leading to an inflamed part is due partly to the same cause as the original enlargement of the capillaries themselves, viz., a loss of contractility, and partly to that increased action of the heart which follows upon severe local inflammation. This increased action of the heart sends blood in greater quantity to every part of the frame, and this is *symptomatic fever*. If this increased action of the heart exist in an extreme degree, the fever is violent;

if the nervous system suffer much, it is accompanied with that disturbance of the function of the brain and nerves which is termed irritation, and we have *constitutional irritation*, or *irritative fever*, produced. If the system has been long used to the stimulus of ardent spirits, or if the patient has lived freely, the loss of the accustomed stimulus, added to the increased flow of blood to the vessels of the brain, may give rise to that peculiar state which we call *delirium tremens*. Should the power of the constitution have been previously exhausted, the symptomatic or irritative fever assumes the form of *typhus*, in place of the milder form of *synochus*, which it takes in the strong and robust.

From what has been said, it appears that in every change which the capillary vessels undergo, the heart or the capillaries themselves are first affected; but that when severe inflammation exists, both are ultimately involved, the heart sending forth more blood, and the capillaries receiving more. In this state, the *heart's action*, which is *muscular contraction*, is increased; the *action of the vessels*, which is *contractile reaction*, is diminished. There is, then, no such thing as increased action of the arteries, or of the capillaries, in the sense in which that term is commonly used: that which used to be called *increased action*, is in fact *diminished action*.*

172. The enlargement of the capillary vessels in inflammation is quickly followed by effusion. If the seat of inflammation be the cutis, as in the case of a burn, serum is thrown out from its surface under the cuticle, and a blister rises; if a mucous or serous membrane is inflamed, fluid exudes from its surface; if the cellular membrane be its seat, the effusion takes place into its cells. This effusion varies with the intensity and nature of the inflammation. The lowest degree of inflammation in these parts merely increases the quantity of their natural secretion—of serum, in the case of the serous membrane; of mucus, when the mucous surfaces are inflamed. A higher degree of inflammation causes the effusion of coagulable lymph (fibrin) or of pus. The increased natural secretion of the serous membranes is dropsy; that of the mucous membranes, flux. Both these membranes, when the inflammation is more intense, pour out fibrin or pus. Thus the pleura secretes fibrin, which glues its surfaces together, and which becoming organized, forms permanent adhesions; from the same cause arise adhesions of the peritoneum. The mucous membranes, too, in states of severe inflammation, pour out coagulable lymph, which sometimes takes the shape of

* See these truths forcibly stated in Dr. Billing's "First Principles of Medicine." Consult, also, on the subject of Inflammation, Dr. Alison's excellent paper in Lib. of Pr. Med.

the tube in which it is formed. This occurs in the larynx in croup, in the bronchial tubes in a peculiar form of bronchitis, in the intestines, in the urethra, &c. These secretions assume so completely the shape of the tube in which they are formed as to be sometimes mistaken for the lining membrane itself. Examples of the effusion of pus are, in the case of the serous membranes, empyema; in that of the mucous membranes, gonorrhœa, &c.

173. When the capillaries, dilated in inflammation, return to their natural size, and any fluid which may have been poured into the surrounding textures is absorbed, the inflammation is said to terminate by *resolution*; when fluid is thrown out, by *effusion*; when coagulable lymph is formed and organized, by *adhesion*; when pus is effused, by *suppuration*; when the part dies, by *gangrene*.

174. When inflammation attacks the cellular membrane, whether in the skin or in the parenchyma of internal organs, it takes different courses according to its intensity. If the inflammation is slight, it terminates in *resolution*; if more severe, *effusion* may take place; if more severe still, the part *dies*. If a small part only dies, provision is directly made for its separation from the body. This is effected by the effusion of fibrin and pus from the living structures bordering upon it: the fibrin is deposited in the form of a membrane around the dead part, the pus within the fibrin, and thus the dead part is separated from the living.

175. This collection of pus around a dead portion of cellular membrane is called an *abscess*, the *walls* of which are formed by the effused and organized fibrin. Sometimes the constitution is not strong enough to build up and organize a wall of fibrin about the dead part, and then the pus finds its way into the surrounding cellular texture, and a *diffused abscess* is the result; or the inflammation is of a peculiar character, as in erysipelas, and suppuration takes place with little or no adhesive inflammation.

176. The fibrin thrown out around a dead portion of cellular membrane, and forming the walls of an abscess, becomes organized by vessels, which either form within it, and then connect themselves with those of the surrounding parts, or are gradually extended into it from those parts. These newly-organized portions of fibrin are arranged in the form of small rounded vascular points, placed side by side around the cavity, and called *granulations*. From the surface thus created fresh pus is formed, which causes the abscess to increase in size, and to press with augmented force on surrounding parts. Some of these parts yield to the pressure, and then the abscess is said to *point*. If the abscess is near the sur-

face, the skin itself offers the least resistance ; it is therefore protruded, and stretched more and more till it bursts.

177. If an internal organ (as the liver) is the seat of abscess, its firm parenchyma offers more resistance than the loose texture of an adjoining intestine ; hence the abscess exerts its chief pressure upon the coats of the intestine. This pressure sets up adhesive inflammation of the two layers of serous membrane ; they are glued together by coagulable lymph ; the peritoneum and the coats of the intestine thus become one continuous texture, through which the abscess, continually increasing, forces its way, till it bursts and discharges its contents.

178. When the cellular membrane is divided by a wound, and the two edges of the wound are brought close together, fibrin is effused, which becoming organized, the wound heals ; a narrow red line being left at first, which in process of time becomes pale. This is called a *cicatrix*, and the part is said to have healed by the *first intention*. But the part may not heal in this simple manner, and then an open sore or *ulcer* is formed, presenting the same characters as the walls of an abscess which has burst, viz., a collection of granulations.

179. These granulations, like those of an abscess, secrete pus, which moistens them and protects them from the air, while the pus which is nearest the surface, drying into a scab, renders the protection more complete. The new granulations, once completely organized, secrete fresh coagulable lymph, and this, in its turn, is organized so as to form new granulations ; and thus the ulcer is at length filled up to a level with the surrounding skin, and covered by a layer of cuticle. The various appearances presented by the granulations, and the changes which they undergo with alterations in the general health, form a subject of interesting and instructive study to the surgeon.

180. *Gangrene* has been mentioned as one of the terminations of inflammation, and the death of a limited portion of the cellular or other texture has been described as the cause of abscess. The common boil may be mentioned as an example of a more extended death of the cellular tissue. But gangrene may take place without leading to the formation of an abscess. Thus, it may attack a limb, in consequence of the extreme debility of the circulation in it, and, beginning in the foot, extend upward, involving the entire circumference of the limb, until it reaches a part where the circulation is active enough to allow of adhesive inflammation, when coagulable lymph will be thrown out in a circle, dividing the sound from the dead parts ; granulations will be formed, pus effused, and at length a natural amputation of the dead mem-

ber will be effected. Thus, in consequence of the different effect produced by different degrees of inflammation, and of the various secretions thrown out in different stages of the process, the body is enabled to set limits to its own diseases, and to repair the most severe injuries. Sometimes gangrene takes place without any accompanying inflammation, as in a limb of which the arteries are ossified, or in cases of poisoning with ergot of rye : this is *dry* gangrene.

181. A complete description of inflammation, including its causes, its phenomena, its terminations, the various modifications which it undergoes in different states of health, in every variety of constitution, and in every texture of the body, would exceed the limits of this work. What has been said is merely intended to show the important part which the capillary vessels have to perform, and the general character of the **changes which they undergo.**

182. *Congestion* is a state of capillaries closely allied to that of inflammation. It consists of a passive enlargement of those vessels, unaccompanied by the symptoms of inflammation, unattended by effusion either of lymph or pus, but sometimes combined with an increase of the natural secretion of the part. This enlargement of the vessels is the effect of debility, and, as such, is apt to continue in parts in which the symptoms of acute inflammation have been subdued. It is of common occurrence in the aged, and in persons exhausted by long suffering. In addition to the capillary vessels, it involves chiefly the veins, while inflammation has its principal seat in the arteries. This seems to be implied in the term *venous congestion*. Pressure is a common cause of this state ; thus, we have congestion of the veins of the leg after long standing, congestion of the vessels of the head from wearing a tight cravat, congestions in the lungs from impediments to the respiration, &c.

183. *Hæmorrhage* is a common consequence of this state of congestion ; but it sometimes is of a more active character, and appears to flow immediately from the arteries. It is sometimes caused by the rupture of an artery, as in most cases of hæmoptysis ; at other times, as in hæmorrhage from the mucous membranes, it seems to exude through the coats of the capillaries or veins.

184. It yet remains to consider two important functions performed by the *capillaries*, viz., those of *nutrition* and *secretion*. *Nutrition* appears to consist in the effusion of liquor sanguinis into the interspaces of the capillary vessels, and the attraction by the living solid of those parts of that fluid out of which they themselves were originally formed. These parts are all built up of cells in some shape or other.

185. *Secretion* takes place either in cells or on the surface of simple membranes, or in glandular structures, which consist of such membranes folded into a variety of shapes for the purpose of creating a large surface in a small space. The internal or secreting surfaces are covered with granules (epithelium) of different sizes and shapes in different parts; the external surface is surrounded with a net-work of capillary vessels and veins. The secretion formed from the blood of the capillaries permeates the membrane, filling the cells, if the secreting organ be cellular; or appearing on its surface, if it be membranous; or collecting in ducts, as in the case of the liver and kidney.

186. An example of secretion into cells is afforded by the adipose cellular tissue, which contains an oily fluid, the fat, destined to give roundness to the form, to facilitate motion, to protect the external parts from cold, and to serve as a store of nourishment. Examples of secreting organs in the form of membranes are the serous membranes—the pleura, the peritonæum, the arachnoid, and the synovial membranes of joints; the mucous membranes—that lining the alimentary canal and the parts communicating with it, and that lining the urinary passages and organs of generation; and, lastly, the skin, a compound organ containing a variety of secreting glands.

187. *Glands*, in the usual acceptation of the term, are of three kinds: 1, mere collections of blood-vessels, as the spleen and the placenta; 2, lymphatic glands, which are similar congeries of lymphatic vessels; and, 3, true secreting organs. These latter are of two kinds, the one secreting into cells a fluid destined to be again removed by absorption, *e. g.*, the thymus and thyroid glands; the other furnished with ducts for the discharge of fluids, which are either destined to subserve other purposes in the economy, or to be thrown off as useless, as the lungs, the liver, the kidneys, the breasts, &c. These organs all consist of an excretory duct, which, if we trace it backward from its trunk, divides into branches, and these, again, into others of smaller size, until the smallest terminate in blind extremities of various shapes, called cells, cryptæ, acini, &c. On the outside of these minute terminations the capillary blood-vessels ramify, and the appropriate secretion, permeating the invisible pores of these vessels, drops into the cell, crypt, or acinus, and thence flows into the duct. The blood which is not used in the secretion is returned by appropriate veins.

188. Secretion, like nutrition, is subject to differences in degree and in kind. The natural secretion of a part is augmented by increased flow of blood, provided severe inflamma

tion be not present : increased perspiration from exercise, and diarrhoea from slight inflammation of the mucous membrane of the bowels, are examples of this. It may also be increased by debility of the capillary vessels, when the circulation is languid, as in the cold sweats preceding dissolution. The nerves, too, have great effect on the secretions, as is seen in the flow of tears from grief, joy, or other violent emotion, and in the effects of fear or anxiety on the skin, kidney, and bowels. On the other hand, the natural secretion of a part is diminished when it receives a small quantity of blood, as is the case with the skin in the cold stage of fevers ; or when it receives much more than its usual quantity, as in the hot stage. In this latter case, as soon as the fever subsides, and the quantity of blood sent to the skin is diminished to a certain point, the sweating stage begins. Mental emotion, likewise, checks some of the secretions. Thus, fear, which increases the secretion of the skin, checks that of the salivary glands, and the mouth becomes dry and parched.

189. But secretion varies in *kind* as well as in degree ; in other words, the secretions are liable to a variety of morbid changes. Thus, the serous membranes, which in health secrete but a small quantity of serum, under a certain degree of inflammation pour out an increased quantity, and dropsy results ; a higher degree causes effusion of liquor sanguinis ; a still higher, of fibrin ; a different and, perhaps, higher degree, of pus. The mucous membranes, according to the degree of inflammation, secrete a serous fluid, or fibrin, or pus, or all these secretions blended in different proportions. They may all be observed in the course of a severe attack of coryza.

190. *The Veins.*—The veins are larger than the arteries, and have no elastic coat. The veins of the extremities also differ from the arteries in being provided with valves to prevent regurgitation, and give support to the column of blood which they contain. The circulation of the blood through the veins is effected partly by the impulse of the heart continued through the capillaries ; partly by the contraction of the muscles of the extremities, which, aided by the position of the valves, presses the blood toward the heart ; partly by the movements of respiration ; and partly, as some suppose, by the suction of the heart itself.

191. At each inspiration the cavity of the chest is enlarged by the descent of the diaphragm, and the elevation and the tilting outward of the ribs. The enlargement thus effected tends to produce a vacuum, which must be prevented by the entrance of air, or blood, or both. Experiments have shown that the motion of the blood in the large veins is thus accel-

erated. That this effect on the circulation is produced, is shown by the admission of air into a wound in the larger venous trunks, but its influence does not extend beyond the axillary vein. It has also been shown, experimentally, that at each systole of the heart a tendency to a vacuum exists in the pericardium, which is prevented by the blood of the large veins distending the auricles.

192. The assistance given to the venous circulation by inspiration is somewhat counteracted during expiration, when the pressure exercised on the contents of the chest causes regurgitation of blood into the larger veins. There is, however, a balance in favor of the circulation, the effect of inspiration being greater than that of expiration. When the right auriculo-ventricular valve admits of regurgitation, the blood flows back into the descending cava and jugular vein, causing a venous pulse, and counteracting, to a certain extent, the effect of the contraction of the heart just mentioned.

193. Experiments have shown that poisonous substances introduced into wounds soon find their way into the veins. This proves either that the veins themselves absorb, or that the capillaries which terminate in the veins possess this power. It is through this absorption into the circulation that poisons act; hence the efficacy of ligatures applied above wounds, of the abstraction of the blood below the ligature, and of the application of cupping glasses, which answers the double purpose of a ligature and evacuator. The subject of absorption demands, however, a few words more.

194. *Absorption* is of two kinds; the absorption of fluids and the absorption of solids, or interstitial absorption. The capillaries, the veins, or both, have the property of absorbing fluids; but in addition to these, the lacteals and the absorbents, properly so called, are provided, the one for the absorption of the chyle from the intestines, the other for the absorption of lymph from every part of the body.

195. Absorption is certainly effected in more ways and by more means than one. Living and dead tissues allow the passage of fluid and gaseous matters through them. To this process the term *imbibition* is applied.

If two gases are in contact with the moist surfaces of a bladder, one being within it, and the other external to it, both will permeate the bladder till they are equally mixed. A gas, likewise, will permeate a moist bladder to mix with a fluid within it. This takes place in the lungs. Again, if a vessel be filled with water, and a moist bladder be tied over its mouth, so that the fluid is in contact with the bladder, and a salt be strewed over its surface, it will be dissolved by the water which permeates the pores of the bladder. If a tube filled

with a solution of salt, or sugar, and closed by a piece of bladder, be placed in water, the water permeates the bladder, mixes with the solution, and rises in the tube. At the same time, a portion of the fluid contained in the tube traverses the bladder in an opposite direction, and this interchange takes place till the fluids on both sides of the bladder have become homogeneous. If the arrangement be reversed, so that the denser liquid is external to the bladder, and the rarer liquid in the tube, the liquid in the tube passes through the bladder, and gradually sinks to a lower level. These phenomena have been named by Dutrochet "endosmose" and "exosmose."

196. Matters in solution pass into the capillaries, and thence into the venous blood by this process of "endosmose," which goes on the more rapidly, as the denser fluid (the blood) contained within the vessels is no sooner diluted than it gives place to a fresh portion, and thus endosmose takes place more completely and goes on more constantly than in fluids at rest. By endosmose, then, matters held in solution, provided the solution be not of greater density than the blood itself, find their way into that fluid.

197. This process of absorption by the capillaries and veins is very rapid, so that in a part free from epidermis it is almost instantaneous, and minute portions of fluid, or of any substance held in solution, may not only be absorbed, but may be distributed through the circulating system in from half a minute to two minutes, or even less. In this way the rapid action of the more energetic of the poisons may be explained. One poison only, hydrocyanic acid, has been thought to act too rapidly to have its fatal effects thus accounted for; but the experiments of Mr. Blake have shown that even this subtle poison must be absorbed in order that it may destroy life. It has been also shown that when the vapor is prevented from entering the lungs its fatal action is retarded. The rapidity with which absorption takes place is well illustrated by the rapid passage of certain salts from the stomach to the kidney. In one experiment made by Westrumb, prussiate of potash was detected in the urine in two minutes from the time of its being taken into the stomach.

198. Several agents affect the rapidity with which imbibition and absorption take place. Galvanism is the chief of these. Thus, Foderé has shown that when sulphate of iron is introduced into the peritoneum, and prussiate of potash into the pleura, five or six minutes usually elapse before the two substances combine, but that their combination is instantaneous when a slight galvanic current is passed through the diaphragm. This fact explains the efficacy of galvanism in promoting the absorption of fluids. Distention of the vessels

renders absorption less rapid; depletion, on the other hand, accelerates it. Hence the use of venesection in dropsy. Imbibition takes place more slowly in parts covered by dense membranes. This is the case with the skin, whose power of absorption is much increased by removing the cuticle. To facilitate absorption by the skin, friction is used, by which means medicines and nourishment may be introduced into the system.

199. The absorption of fluids, provided they be of less density than the blood, is thus easily accounted for by endosmose, which probably takes place chiefly through the coats of the capillaries or veins. It is by this means that poisons find their way into the system.

200. The absorbent vessels seem destined to take up and restore to the circulation the serum (that is to say, the liquor sanguinis, *minus* the fibrin that has been used to build up the solid textures of the body) which has exuded through the parietes of the capillaries. They rarely contain either matters introduced from without, or abnormal secretions of the body itself.

201. The absorbents leading from poisoned wounds, and from simple punctures in certain unhealthy states of the system, are very apt to become inflamed, the inflammation often extending to the absorbent glands, and exciting inflammation and suppuration in them. The absorbents are also most probably the instruments by which interstitial absorption (absorption of the structure of the body itself) is brought about.

202. Of disordered function of the absorbent vessels little is known. Formerly all dropsical effusions were attributed to some fault of the absorbents, and remedies were given to promote absorption by stimulating those vessels into activity. There can be no doubt that the functions of the absorbents, like those of other vessels, vary in activity at different times and under different circumstances; but as the veins have been proved to possess the power of absorption as well as the lymphatics, it is difficult to assign to each class of vessels its proper sphere of activity, whether in health or disease. It has been shown, for instance, by direct experiment, that the veins absorb poisons, but it is no less clearly demonstrated by disease that some poisons excite inflammation in the entire course of absorbent vessels, and in the glands through which they pass; and this is attributed, and probably with justice, to the absorption of the poison by these vessels. But whatever may be the precise share taken in the process of absorption by the veins and absorbents respectively, there can be no doubt that the influence of the absorbents in the production of dropsies has been much exaggerated. These effusions

arise in various states of the system, and from various causes. Mechanical obstruction, inflammation, and venous congestion all cause effusion of serum; an effusion too abundant to be removed by the unaided though still healthy action of the absorbent vessels. If the obstruction be overcome, or the venous congestion removed, or the inflammation subdued, the effusion ceases, and time alone is required to enable the absorbent vessels, whether veins or lymphatics, to take up the fluid which has been poured out.

203. The well-known efficacy of venous distention in preventing absorption, and of depletion in promoting it, point at once to the most efficacious means of removing dropsical effusions, viz., blood-letting, and the increase of the several secretions. If with the dropsy there is sufficient strength of constitution, these means will suffice for its removal; if not, tonics must be combined with the antiphlogistic measures.

204. The absorption of the solid structures has also been attributed to the increased action of the lymphatics, but perhaps without sufficient reason. Pressure, friction, and electricity, as well as mercury and iodine, are as likely to affect the capillaries which are the cause of the morbid growth as the lymphatics or veins which are instrumental in removing it—moderate pressure, by giving support to the capillaries; stronger pressure, by still further diminishing their size; friction and electricity, by stimulating their coats, and restoring their contractility; and iodine and mercury, by a local action on those vessels, whether through the skin, or more circuitously through the circulation. The cessation or gradual removal of such tumors by these causes may be much more satisfactorily explained than by an action upon the absorbents.

205. In the case both of dropsies and tumors, the result is the same, whether the capillaries, ceasing to secrete fresh fluids or solids, the absorbents by degrees remove that which has been effused; or the capillaries, continuing to secrete, the absorbents are excited to a corresponding increase of activity. The only difference is this, that, according to the former supposition, the cause is permanently removed; according to the latter, the effect is merely counteracted. The first supposition seems most feasible.

3. STRUCTURAL PATHOLOGY.

206. The structures of the body undergo two kinds of change—the one depending upon abnormal nutrition, the other on morbid secretion.

207. *Abnormal Nutrition.*—Nutrition may be excessive or defective. The former is called *hypertrophy*, the latter, *atrophy*. The principal cause of *hypertrophy* is increased action: this is

shown in the muscles of the athlete ; in the heart when it encounters some obstacle to the circulation, and is obliged to contract with additional force to overcome it ; in the mammaræ of the female when secreting milk ; in the mucous membrane of the bladder exposed to constant irritation from stone, gravel, &c. *Atrophy* arises from opposite causes ; from disuse of parts, as of the muscles in the sedentary, in the paralytic, and in the bedridden ; or from obstruction to the flow of blood by ligatures, bandages, &c. Atrophy is accordingly accompanied by paleness of the parts affected, hypertrophy by increase of color. Hypertrophy and atrophy are sometimes limited to one constituent part of a texture. Thus, bone sometimes assumes unusual hardness, from the crowding of several earthy particles into the space commonly occupied by a few. On the other hand, the bones are subject to softening, from an absence of the earthy matter. This constitutes *mollities ossium*.

208. *Morbid Secretions*.—The changes of structure due to this cause consist (*a*) in the effects of common inflammation occurring in any part of the body, (*b*) in the deposit of normal structures in abnormal situations, (*c*) in interstitial deposits, and (*d*) in the formation of cysts.

(*a*) Structural changes, the effects of inflammation, have already been adverted to (sec. 172–180). (*b*) Familiar examples of the deposit of normal structures in abnormal situations are the gradual conversion of the coats of arteries, and of the muscular structure of the heart, into bone ; a change which is of frequent occurrence in old persons, and is hastened and promoted by the previous deposit in the same parts of the ordinary products of inflammation. (*c*) Interstitial deposits are either products of inflammation, in which case they belong to the first class (*a*), or they consist of some natural constituent of the textures in increased quantity ; or, lastly, they are substances not naturally entering into the constitution of any part of the frame. Examples of these three classes of interstitial deposit are, the induration which sometimes follows inflammation from the deposit of fibrin ; the increased deposit of fat in the cellular membrane surrounding and connecting the blood-vessels and ducts of secreting organs, as, for instance, the liver ; and tubercular and melanotic formations. (*d*) Of this species of structural change, cancer forms a familiar example. Some of these changes of structure require to be more minutely examined.

209. Coagulable lymph, the only one of the secretions which is capable of being organized, becomes a sort of matrix, in which a variety of adventitious growths are deposited, such as the cellular, the serous, the fibrous, the cartilaginous, or the osseous. These adventitious growths are usually deter-

mined by the nature of the texture in or upon which they are formed ; thus, they resemble serous membrane in the cavity of the pleura or peritoneum, they are often cartilaginous in joints, and bear a close resemblance to muscle in the uterus. Such formations are called *analogous*, because they are similar to those naturally forming part of the body. When such formations have no resemblance to natural structure, they are termed *heterologous*.

210. *Heterologous Formations*.—The products of inflammation already examined (see. 172–180) are mostly due to local causes, though they are modified, in some degree, by the state of the constitution. Those now to be considered are dependent upon a constitutional taint, which is very frequently to be traced to hereditary predisposition. Their constitutional origin is proved, by their general diffusion over all parts of the frame, and their existence in organs of widely different character and composition ; by their removal from a part affected being soon followed by their appearance in some other organ ; and by direct experiment, which has succeeded in producing one at least of these diseases, by submitting animals to bad diet and other unwholesome influences.

The formations belonging to this class are *tubercle*, *carcinoma*, and *melanosis*.

211. *Tubercle* is a morbid substance deposited on the surface of membranes, or in the texture of organs. It presents itself in two different forms : the one whitish gray, semi-transparent, and dense ; the other yellow, opaque, and friable. The first may be changed into the second, but the second is never transformed into the first. The gray tubercle is deposited in small, isolated portions, as in the air-cells of the lungs, constituting miliary tubercles, or on the surface of serous membranes. The yellow variety is found in the same situations, as well as on the surface of mucous membranes, and in the substance of the several organs ; in the intestines, in lymphatic glands, in the liver, spleen, brain, uterus, &c. It assumes different forms according to its situation, sometimes being collected in a distinct mass, at others diffused as a homogeneous, cheesy matter. The chemical properties of this substance are not characteristic. It may be resolved into albumen, fibrin, gelatin, salts of soda and lime, and water, with a small quantity of fatty matter. It is sometimes, though rarely, deposited before birth ; is rarely met with before the fourth year ; is frequent between the fourth and fifth ; less frequent, again, from this time till puberty ; most frequent of all between puberty and the age of fifty. The lungs are its most common seat, so that after the age of fifteen it is almost never met with in other organs without existing in them at

the same time. The state of constitution (*tuberculous cachexy*) which leads to their deposition may be either inherited or acquired.

212. *Carcinoma*.—This term was originally applied to a malignant ulcer supposed to bear a resemblance to a crab (*καρκινος*, cancer), but it now comprises many changes of structure which have little in common in their physical characters. Dr. Carswell divides carcinoma into two species, *scirrhus* and *cephaloma*. The varieties of *scirrhus* are scirrhus pancreatic sarcoma, tissu lardace, matiere colloide, cancer gelatiniforme; those of *cephaloma* are vascular sarcoma, mammary sarcoma, and medullary sarcoma. According to Dr. Hodgkin, all these forms of carcinoma consist of compound cysts varying in their solid and fluid contents, growing from broad bases, or from narrow peduncles which spring from a single spot, and giving to the tumor a radiated appearance: the smaller cysts are enveloped in a larger one. The various appearances presented by these tumors are due, in a great measure, to the inflammation which takes place in them and in the surrounding textures, and to the entire or broken state of the several cysts themselves. Carcinoma, like tubercle, is a general disease of the system, assuming different shapes according to the tissue or organs which it attacks. The *cancerous diathesis*, like the tubercular, may be either inherited or acquired, but the effects of the former manifest themselves at a later period of life.

213. *Melanosis*.—This is an unorganized product, of a dark brown, dull bistre, or sooty-black color. It is deposited in masses with or without cysts, or in patches on the surface of membranes. Sometimes it is met with in small points, and occasionally it has been found liquid in accidental cavities. Its most frequent seat is the liver, but it is occasionally found in the eye, the skin, the brain, the lungs, the kidneys, and other glandular organs. Its chemical constituents are albumen, fibrin, and the salts usually found in the blood, with a coloring matter abounding in carbon.

214. Besides the liquid and solid morbid secretions already enumerated, we sometimes encounter secretions of *gas*. The principal seat of these abnormal secretions is the alimentary canal, but they have been found in other viscera, as the urinary and gall bladders, and the uterus. They have not been submitted to any careful analysis, but there is no reason to doubt that they are, strictly speaking, secretions, and not the result of decomposition of the contents of the several viscera in which they are found.

THE NERVOUS SYSTEM.

215. The vital principle, which, in some shape or other, endows every part of the frame, and even the blood itself, with properties altogether different from those of unorganized matter, seems to be more especially connected with the nervous system. The brain, as the organ of the mind, is the immediate source of volition, and the part to which all impressions on the nerves of sensation are ultimately referred: the spinal cord, a continuation of certain parts of the brain, is the immediate origin of the greater part of the nerves both of sensation and volition, and both together form the joint source from which all the nerves of sensation and voluntary motion arise, from which the mandates of the will are sent forth, and to which the intelligence of the senses is conveyed. In addition to these important parts of the nervous system, there is a separate center of nervous influence in the sympathetic, which, connecting itself, in a manner little understood, with the nerves of motion and sensation, presides over the functions of those organs which are the most essential to life, and is the cause of the greater part of those movements which are independent of the will, of many of those sensations by which life is preserved, and of those chemical changes which are peculiar to organized beings. For the important movements of respiration, moreover, a peculiar set of nerves is provided.

216. But there is still another function, and a corresponding set of nerves, to which the attention of the profession has been strongly directed by Dr. Marshall Hall and Professor Muller: the reflex function and the excito-motory system of nerves. There are certain parts of the body, chiefly internal surfaces, and especially their outlets, which, when irritated, excite contraction of the muscles most nearly associated in the functions of those parts. Thus, if the lining membrane of the air-passages is irritated, the respiratory muscles are thrown into violent action. Here there is no exercise of volition, and yet there is muscular contraction. Observations in cases of paralysis attended with loss of sensation and voluntary motion, and experiments on decapitated animals, have further shown that, for the production of these effects, it is not necessary that sensation or volition should be present. Hence it became necessary to suppose the existence of a separate set of nerves; one going from the skin, or mucous membrane, to the brain or spinal marrow; and the other from those organs to the muscles. The absence of common sensation and volition at once pointed to the spinal marrow, and not the brain, as the center of union of these two sets of

fibres ; and what theory has pointed out as necessary, the scalpel, in the hands of Mr. Grainger, has shown to be true.

217. The following scheme, therefore, will represent the several orders of nerves, and the relations which they have to the brain and spinal marrow :*

(1.) The cerebral, or sentient and voluntary, of which the brain is the center.

(2.) The true spinal, or excito-motory, of which the true spinal cord is the center.

(3.) The ganglionic, or the nutrient, secretory, &c., of which the sympathetic forms the principal portion.

218. The first order of nerves comprises all the nerves of *sensation* (the olfactory, the optic, the auditory, the gustatory, and the nerves of touch), and all the nerves of voluntary motion. The common center of all these nerves is the cerebrum and cerebellum. The greater part of the nerves of touch or common sensation may be said to unite with the greater part of the nerves of voluntary motion in forming the external portions of the spinal marrow, and in this manner to communicate with the brain.

219. The second set consists also of two orders of nerves, of which the one passes chiefly from the internal surfaces to the interior parts of the medulla oblongata and spinalis, and the other from the same parts to muscles having peculiar actions subservient chiefly to ingestion and egestion. Some fibres of the same order of nerves are probably distributed to other parts of the body, as the skin and the muscles of voluntary motion. That part of the spinal marrow to and from which these nerves run, is called by Dr. Marshall Hall the *true* spinal marrow, in contradistinction to those parts of it which are formed by bundles of cerebral nerves. The motions due to this system are termed *excited*.

220. The third class of nerves, or the ganglionic, is divided by Dr. Marshall Hall into the *internal* ganglionic, or the sympathetic, including some few fibres of the pneumo-gastric ; and the *external* ganglionic, embracing the fifth nerve and the posterior roots of the spinal nerves. These latter nerves are supposed to be chiefly destined for the nutrition of the external organs.

221. The functions corresponding to the several divisions of the nervous system, then, are, 1, sensation and voluntary motion ; 2, excitements to action without sensation, and combined motions without will ; and, 3, nutrition, secretion, and the motions connected with them.

* See Dr. Marshall Hall's Principles of the Theory and Practice of Medicine, p. 242, et seq., and his Lectures on the Nervous System. Also, Grainger on the Spinal Cord.

222. The nerves consist of minute fibres, inclosed in sheaths; distinct through their entire course, and terminating in the parts to which they are distributed, either by free isolated extremities, or by loops between every two fibres, or by net-work, like blood-vessels. Experiment has made us acquainted with the functions of the more important nerves of the body, but has left much yet to be discovered. It has also thrown light on the laws which govern the transmission of nervous influence, though it has left the nature of that influence involved in the same obscurity which hangs over the real essence of light, heat, or electricity.

223. The effect of the division of a nerve is well known. If the nerve be one of sensation, irritation of the branches or trunk of the nerve below the point of division causes no pain; if it be a nerve of voluntary motion, neither the will nor a stimulus applied to the nerve above the point of division can cause the muscle to which it is distributed to contract. On the other hand, if the voluntary nerve be irritated below the point of division or the sentient nerve above it, motion takes place in the one case, and sensation in the other; the sensation being referred to the parts supplied by the extremities of the nerve. This law of sensation is strikingly illustrated in cases of amputation of an arm or a leg, where irritation of the divided extremity of the nerve is referred to the fingers or toes of the lost limb, and that even for years after its removal. A knowledge of the fact that irritation of the trunk of a sentient nerve produces pain, not in the trunk itself, but in the parts to which its branches are distributed, is of constant application in the treatment of disease, and tends to destroy our confidence in the division of nerves as a remedy for pains in the parts which they supply. The failure of this remedy in several cases of *tie-douloureux* has been satisfactorily explained by the discovery of some cause of irritation, as a tumor or spicula of bone, at the origin of the nerve.

224. Although pressure applied to a sentient nerve causes pain in the parts supplied by its branches, a still stronger pressure produces pain in the trunk of the nerve itself. Severe local injury to a nerve of sensation or voluntary motion destroys its power as a conductor of nervous influence, but it affects the nerve itself only locally; for irritation of the portion of the uninjured nerve which is in connection with the brain produces sensation, and that of the portion of nerve in connection with the muscles causes muscular contraction. When, however, a nerve of motion is stretched violently through its whole length, it loses its property of exciting muscular contractions, and sometimes the muscle itself loses its irritability, and can not be made to contract by any stimulus, however powerful.

225. Experiments on animals have brought to light some properties of the nerves, which may be advantageously borne in mind by the pathologist. In the first place, it has been proved beyond a doubt that all stimulants applied to the nerves in the dead body act in nearly the same way, and produce effects differing merely in degree. Of such stimulants, the electric and galvanic fluids are the most effectual, and they have been accordingly employed in almost all experiments on the properties of the nerves. These experiments have shown that the nerves, when stimulated by galvanism, do not act as mere conductors of the galvanic fluid, for the muscles contract when the galvanic current is made to pass transversely through the nerve; and the muscles can not be made to contract by any degree of mechanical irritation applied to a nerve of sensation, while the slightest irritation of a nerve of motion gives rise to very strong contractions of the muscles. Hence, then, it appears that there resides in the nerves themselves a property of exciting muscular contractions on the application of stimuli, independent of the brain and spinal cord. It has been further shown that this property may be exhausted by the continued application of a stimulus, and that it returns again after an interval of rest.

226. These experiments on the bodies of animals have been corroborated by others made during life on the human subject; and it has been satisfactorily proved, not only that all stimuli, whether mechanical, chemical, or electrical, act in the same way, but that they cause the several nerves to which they are applied to manifest the characteristic properties with which they are endowed. Thus, irritation of nerves of common sensation causes pain; of nerves of motion, muscular contraction; of the retina, the sensation of light; of the auditory nerve, that of sound. The stimulus of galvanism, too, excites in each organ of sense the sensation proper to it: taste in the tongue, a peculiar smell in the nose, light in the eye, a musical sound in the ear.

227. Some of the stimulants which have been mentioned admit of application in disease. Of these, heat, cold, and electricity are the most important. Both heat and cold cause the muscles to contract, and both in excess destroy the irritability of the muscles. Cold water injected into an artery causes contraction in the muscle which it supplies; and this fact has been taken advantage of in cases of uterine hæmorrhage after delivery, by injecting cold water into the vessels of the still-adhering placenta. The efficacy of cold applied externally or internally, especially if its application be sudden, in causing contraction of the uterus, is well known. The good effects of electricity and galvanism, in exciting muscular contractions, have been manifested in some cases of paralysis.

228. The nervous power, which after death is exhausted by the continued application of stimuli, is exhausted also in the living body, and in both cases rest is required for its restoration. The effects of this exhaustion on the entire frame are repaired by sleep; in parts of the body by repose, or change of action, which is but a form of repose.

229. The effects produced in nerves of sensation or motion by the application of stimuli are very remarkable. If the stimulus be very powerful, it may entirely destroy the excitability of the nerve, though applied only momentarily, as in the case of a flash of lightning producing permanent blindness. The same stimulus may at once annulate the nervous power of the brain and spinal cord, and produce sudden death. Permanent paralysis may arise from the same cause. A weaker stimulus applied for a longer time may produce the same effect. Snow blindness, from the continued strong reflection of light on the retina, is an illustration in point; the paralysis of the muscles which sometimes follows violent and long-continued exercise is another example of the same kind.

230. Still weaker stimuli, or the same stimuli applied for a shorter period, exhaust the excitability of the nerve, and cause fatigue. Thus, if we gaze for a long time at the same color, the eye becomes fatigued and insensible to the impression of that color; if we keep the same muscles in action only for a few minutes, as when we hold the arm extended, we feel extreme fatigue. The same result follows if we continue standing in the same position, but the slightest change of posture affords instantaneous relief.

231. Extreme exhaustion of the nervous power is always accompanied by severe pain. Thus, after the long-continued application of the stimulus of light to the eye, the sensibility of the retina is so increased, that even a feeble light produces intense pain, and the stimulus of extreme cold or heat applied to the skin gives rise to acute suffering. In like manner, the long-continued action of the muscles, as in walking, produces the most excruciating agony.

232. The application of stimuli, then, to the nerves of sensation or voluntary motion, produces, according to its degree and duration, entire destruction of the nervous power, or great exhaustion of it, accompanied in extreme cases by severe suffering; and the functions of the nerves are not restored till after an interval of rest proportioned to the degree of the previous exhaustion. Experiment has shown that the brain and spinal cord are the sources whence the restorative influence emanates, and that nerves which have been permanently cut off from those centers lose their property of exciting the muscles to contraction.

233. As all stimuli applied to the nerves produce more or less exhaustion of the nervous excitability, it follows that no medicine acting as a stimulus can strengthen the nervous energy. But there is a class of remedies which have the opposite effect, viz., that of deadening the excitability of the nerves, and, if applied in a concentrated form, of entirely destroying it: these are the *narcotics*. This has been proved both by experiments on animals and by observations on the human subject. If, for instance, the ischiatic nerve of a frog be dissected and allowed to hang in a solution of opium or morphia, it is entirely deprived of excitability. This, however, does not extend beyond the portion of the nerve to which the narcotic is applied.

234. Paralysis of the voluntary muscles, produced by placing the leg of a frog in a solution of opium, or of hydrocyanic acid; of the heart, by the application of infusions of opium and tobacco; of the intestines, by opium and tencinas (all of which effects have been observed in the experiments of Monro, Coulton, Wilson Philip, and Morgan and Addison), are instances of the same kind. Similar local effects are produced in the human body, as evidenced by the loss of contractile power in the iris from the local application of extract of belladonna, by the paralysis of the muscles of the hands caused by the handling of lead, by the loss of sensibility in the lips and tongue occasioned by chewing monkshood, and in the fingers, by the vapors of strong hydrocyanic acid.

235. Such is the local effect of narcotic poisons on the nerves. The *modus operandi* of narcotic poisons taken into the stomach, or otherwise introduced into the system, is a point of great interest in physiology, and of practical importance in the treatment of disease. It has been already shown that poisons, however they may be introduced into the system, enter the circulation, and of course are brought into close contact with the nerves: this, then, is but another form of local application, and must be followed by local effects. But as the whole nervous system would in this way be brought under the influence of the poison, no local effects would be perceived unless the poison had a specific action on some one part of the body. The fact of such local action occurring has been placed beyond a doubt by experiments on animals. Thus, Muller having divided all the vessels and muscles of the thigh of a frog, poisoned the animal with nux vomica, and found that the irritability of the sound leg was lost much sooner than that of the leg of which the vessels and muscles had been divided. This loss of irritability in the sound leg could be attributed to no other cause than the circulation through it of blood containing the poison, and the consequent local effect of the poison

on its nerves. But though the local action of poisons on the nerves is thus established, it is evident that such local action can only produce dangerous or fatal effects by acting on the more important organs of the body, viz., the brain and spinal marrow, the heart, or the lungs; and as these organs would all be locally affected by the poison, it is unnecessary to seek for the cause of death in the local effect produced on parts of less importance to the economy. We may safely assume, then, that poisons prove fatal by their action on one of these three organs; and the experiments of Mr. Blake, already referred to (sec. 194), prove that it is in consequence of their being conveyed to those organs by the vessels with which they are supplied.

236. Another fact which has been proved by experiment is, that those poisons which excite strong muscular contractions produce their effects through the circulation, and not by immediate application to the nerves themselves. Thus, strychnine applied in powder to the moist spinal cord of the frog excites no twitchings of the muscles; in order to do so, it must first enter the circulation. So, also, when an animal is poisoned with opium or strychnine, if the nerves of the extremity are divided, the spasms in that limb cease; and if the spinal marrow is cut through before an animal is poisoned with upas or angustura, the parts supplied by the nerves coming from the lower portion of the cord are not convulsed. These experiments prove that narcotics do not excite contractions of the muscles by their direct action on the nerves, but through the medium of the spinal cord and brain. The general symptoms of poisoning, therefore, may be safely attributed to the action of the blood, tainted with the deleterious substance, on one or other of the important organs of the economy.

237. The foregoing observations apply chiefly to the nerves of sensation and voluntary motion, which have the brain and certain portions of the spinal cord for their origin and center. There yet remain to be examined, as of great importance to the physician, the functions of the sympathetic nerve and of the excito-motory system of nerves.

238. *The Sympathetic.*—The functions of this nerve are threefold: it presides over the involuntary motions of the more important viscera of the body; it is the medium by which all impressions are conveyed from those parts to the central organs; and it regulates the process of secretion and of nutrition in every part of the frame.

239. With regard to the first property of the sympathetic—that of presiding over the involuntary motions of the important viscera—it has been ascertained by experiment that the parts which this nerve supplies, as the heart, the intestinal canal,

&c., continue to move long after they are separated from their connection with the rest of the sympathetic system, and even after their removal from the body, and that the contractility of these parts is preserved longer than that of the voluntary muscles. The effects of stimuli applied to the sympathetic nerve are also of longer continuance than those of stimuli applied to the nerves of voluntary motion; and the motions thus excited are either rhythmic, as in the heart, or continuous, as the peristaltic movements of the intestines.

240. All the parts supplied with nerves from the sympathetic are, to a certain extent, independent of the brain and spinal marrow. Thus, the heart will continue to beat long after the division of its nerves, after severe injury of the brain and spinal cord, and even after its entire removal from the body. That the spinal cord influences the contractions of the heart has been proved experimentally; that the brain affects them is shown by the familiar effect of mental emotions upon them; on the other hand, when the mind is tranquil, the heart's contractions are few, and in sleep they fall much below the number during our waking hours. There is good reason, also, to believe, that as the parts supplied by the sympathetic are strongly affected by influences emanating from the brain and spinal cord, so the sympathetic is dependent for its supply of nervous power upon those centers.

241. The impressions made on the nervous fibres of the sympathetic are not usually conveyed to the brain; in other words, they are not of the nature of sensations; but violent causes of irritation may give rise to sensation, either in the parts supplied by nerves from the sympathetic, as in enteritis, or in those supplied by cerebro-spinal nerves. In this latter case, the painful sensations are usually experienced in the extreme parts of the organs affected: thus, we have itching of the nose and anus from the irritation of worms in the intestines, and pain and itching in the glans penis from disease of the kidneys and bladder. These are examples of pain reflected from the sentient nerves of the spinal cord. Irritation in the intestines, or a disordered condition of the uterine functions, are familiar causes of reflected sensations of a still more marked character, such as the acute pain in the abdominal muscles occurring in hysterical females, accompanied by tenderness of the spine itself, and sometimes removed by remedies applied to that part.

The same irritation conveyed to the spinal marrow, and accompanied by tenderness there, may be reflected from the same parts on the nerves of voluntary motion, giving rise to a long list of spasmodic diseases; such as convulsions, chorea, and tetanus, in children from intestinal irritation; hysteria

affecting the muscles of voluntary motion, but especially those of respiration, arising in adults from the same cause; vomiting and hiccough from irritation of the intestines, kidneys, uterus, &c.

242. The sympathetic nerve has been shown to preside over secretion and nutrition, and, consequently, over the functions of the parts concerned in these important processes: the capillary vessels, therefore, and the arterial system generally, fall under its influence. Of these, the organic functions of the sympathetic, and of the degree in which they are dependent upon the brain and spinal cord, less is known than of its other properties. There is reason, however, to believe that the sensations of cerebro-spinal nerves are reflected from the spinal marrow on parts supplied by nerves from the sympathetic. Thus, syncope may occur from impressions on sentient nerves.

243. Instances of the reflected action of the organic fibres of one part on those of another are very numerous. Thus, inflammation of the testicle may be replaced by that of the parotid, erysipelatous inflammation of the skin by that of the brain, gouty inflammation of an extremity by a similar inflammation of an internal organ, rheumatic affections of a joint by that of the heart. So, also, with secretions: the secretion of the skin, for instance, may be replaced by that of the kidney. In this case, perhaps, the effect is less exclusively due to nervous influence than in the former.

244. The suppression of habitual secretions, whether natural or acquired, gives rise to similar reflex actions of the organic nerves. The suppression of the menstrual discharge, for instance, is sometimes followed by a periodical discharge of blood from the lungs, which scarcely admits of any other interpretation than the one now assigned. The suppression of an hæmorrhoidal discharge may give rise to apoplexy, the drying up of an ulcer to a similar disease of a distant part. These cases, however, admit of explanation on the supposition that a temporary state of plethora is produced, which finds relief in the part most predisposed to take on diseased action. It is probable that all cases of metastasis are partly due to a reflex action of the organic nerves, partly to the quantity and quality of the circulating fluid, and partly to the predisposition of the several organs to take on diseased action.

245. In speaking of the phenomena of inflammation (sec. 161, *et seq.*) certain changes in the size of the capillary vessels were attributed to nervous influence. The enlargement of the capillaries in blushing, and their contraction from the emotion of fear, were shown to be independent of increased action of the heart, and to be strictly local phenomena. It was also

shown that these changes in their caliber can be attributed to nothing else than a modification of their contractility, and this modification itself was attributed with equal reason to nervous influence.

246. Assuming this explanation to be correct, it is obvious that it must apply with equal force to the larger arteries; and this is rendered highly probable by the peculiar character of the pulse which accompanies the first stage of severe febrile and inflammatory affections; a character strongly marked, and furnishing an evidence of the real state of the vessels, almost as complete as the visible redness of the surface in cases of inflammation does of enlargement of the capillary vessels. The pulse here spoken of is distinct from that of health, and from that present in the after stages of these affections; it is present with the first feeling of indisposition, and continues till the characteristic marks of the disease have made their appearance. It is a frequent, full, weak, and compressible pulse, conveying to the finger the most distinct impression of a relaxed and flabby coat, and readily explained by the loss of contractility already spoken of. In the indisposition which ushers in attacks of scarlet fever, erysipelas, cynanche tonsillaris, &c., it is always present, and always most distinct in its character. On the strength of this symptom alone, the strong analogy of the capillary vessels may be extended to the larger arteries, and it may be confidently stated that there is one state of system, at least, in which the larger vessels undergo the same change as the capillaries in inflammation.

247. Is not this condition due to some change in the state of the organic nerves supplying the coats of the blood-vessels? Does not that change consist in a withdrawal of the nervous influence from the vessels? And is not a diminution of nervous power the direct effect of the poison which is the cause of these diseases?

248. On the other hand, in certain cases, as in ague, may not this same state of the larger vessels follow upon an increased action of the vessels of the entire system; that is to say, upon a temporary increase of their contractility, just as in inflammation a dilated state of the capillary vessels follows upon the contraction produced by the application of a stimulus? In the general, as in the local affection, may we not have first the application of a stimulus, accompanied by an increase of nervous influence and consequent contraction of vessels, and then, as the necessary consequence, diminished nervous influence, and relaxation of vessels? This increased contractility of the extreme vessels is the *spasm*, which plays so prominent a part in Cullen's theory of fever. *Spasm* of the small vessels is a state of short continuance, not overcome by a reaction in the cen-

ter of the circulating system, but yielding to that diminished elasticity which follows as certainly upon increased action as blunted sensibility upon over-exertion of the organs of sense, and fatigue upon long-continued or violent action of the muscles. This is theory, and as such is introduced here, with some fear that it may be thought out of place.

249. The sympathetic nerve, as the name implies, is assumed to be the organ of many of those combined sensations, motions, secretions, &c., which have received the name of *sympathies*. The discovery of the reflex system of nerves has traced some of these to a different source; but from whatever cause they arise, they well deserve the attention of the physician.

250. The different parts of the same tissue are said to sympathize with each other; thus, in catarrh, inflammation is readily communicated from one part of the mucous membranes to another; inflammation of one serous membrane is sometimes followed by that of another, as peritonitis by pleuritis; gouty or rheumatic inflammation of the fibrous tissues of a joint by the same inflammation of the same tissue in the heart; inflammation of one tract of absorbent vessels by that of the glands through which they pass; and inflammation of the veins of the uterus by that of the same vessels in other parts of the body.

251. Different tissues are also said to sympathize with each other, but this happens more rarely. Sometimes, for instance, an inflammation commencing in the mucous membrane of the intestine extends to the muscular, and thence to the peritoneal coat; so, also, severe inflammation of the muscles of the side (Pleurodynia) may extend to the pleura. The sympathy between the skin and mucous membranes is familiar to every observer. The viscera and their investments likewise sympathize with each other. Thus, disease of the substance of the lungs, heart, liver, uterus, ovaries, testicle, &c., are often accompanied by more or less inflammation of the serous membrane which covers them.

252. The sympathies of entire organs with each other are still more important. These may be classed as follows:—
1. Sympathies between organs which have similar structure and function; as between the salivary glands, the heart and blood-vessels, the stomach and intestines, and the several parts of the nervous system. 2. Sympathies between organs of different texture, but belonging to the same system; as the chylipoietic, the uropoietic, the generative, the respiratory system, and the united respiratory and circulating system, viz., the lungs and heart. 3. Sympathies of the more import-

^a See Müller, vol. i., p. 812.

ant viscera with the central organs of the nervous system ; as in the affection of the brain which follows intestinal irritation in children, and the affections of the stomach attending injuries of the brain. 4. Sympathies between organs not connected in any of the foregoing ways, and only to be explained on the principles of reflection : such are, the sympathy of the parotid gland and testicle ; of the mamma and uterus ; of the larynx, the respiratory organs, and the glands which secrete the hair, with the parts of generation.

253. In all these sympathies the nerves play an important part ; but the several parts of the nervous system also sympathize with each other. Thus, the nerves of the surface and the central organs of the nervous system react upon each other ; the affection of the central organs in fever causing the various conditions of the skin ; and shocks of different kinds applied to the skin exciting the brain and spinal cord. Thus, cold water, poured on the head, restores the brain exhausted by long-continued inflammation, and, dashed in the face or thrown on the chest, removes an hysterical fit, excites the nervous centers in cases of narcotic poisoning, restores persons in the state of syncope, and is among the most efficacious remedies in asphyxia. In all these cases the central organs are roused into activity by the shock applied to the surface.

254. The sensitive nerves sympathize with sensitive, the motor with motor, and the sensitive and motor with each other. The optic, the olfactory, the auditory, and the ciliary nerves of the two sides are affected at the same time and in the same way, and an affection of the one side often leads to a similar affection of the other : thus, inflammation of one eye is often followed by inflammation of the other ; deafness of one ear by deafness of the other ; alterations in the size of one pupil by a similar alteration in the size of the other. This sympathy between nerves of sensation extends also to nerves of different kinds and functions : thus, a strong light on the eye produces tickling in the nose, tickling the feet throws the whole body into convulsions, certain sounds put the teeth on edge, a tumor on a nerve may produce pain or spasms in parts of the body in no way connected with it. To phenomena of this kind the term *radiation of sensations* has been applied. Sympathies of motor nerves with each other occur in all associated movements. Those of motor with sensitive nerves belong to the class of excited or reflected motions.

255. To the same class belong the important phenomena of associated movements excited by nerves which do not convey sensation. A very considerable part of the motions which

take place independent of the will may be safely referred to this head. The following plan will exhibit the extent and importance of that system to which the name of excito-motor has been given :

<i>Incident motor branches.</i>	<i>Reflex motor branches.</i>	<i>Excited actions.</i>
I. Trifacial, arising from		
<i>a. The eye-lashes.</i>	The trochlearis } oculi.	Protective and other movements of the eyes and eyelids. Of the iris? (Facial respiratory movements), Sneezing, laughing, &c.
<i>b. The alæ nasi.</i>	The abducens }	
<i>c. The nostril.</i>	Minor portion of the fifth.	
<i>d. The fauces.</i>	Orbicularis } from the	
<i>e. The face.</i>	Levator alæ nasi } facial.	
II. The Pneumo-gastric, from		
<i>a. The pharynx.</i>	The pharyngeal.	Of the { In ingestion pharynx, { of food, suc- tion, deglu- tition, &c.
<i>b. The larynx.</i>	The laryngeal.	Larynx, { Closure of glottis, &c.
<i>c. The bronchia.</i>	The bronchial, &c.	Motions of the air-passages in respiration and of œsophagus and stomach in digestion.
<i>d. The cardia, kidney, and liver.</i>	The œsophageal and cardiac.	
III. The glosso-pharyngeal.	The myo-glossal.	Associated movements of tongue and pharynx.
IV. The posterior spinal, from		
<i>a. The general surface.</i>	The spinal accessory.	Movements of the muscles of respiration.
<i>b. The glans penis and clitoridis.</i>	Diaphragmatic, } from the	Expulsion of feces, urine, and semen, and of the fœtus in parturition.
<i>c. The anus.</i>	Intercostal, }	
<i>d. The cervix vesicæ.</i>	Abdominal }	Retentive movements of the sphincters, viz., of the cardia, of the valvula coli? of the sphincter ani, sphincter vesicæ (neck of uterus?), and vesiculæ seminales?
<i>e. The cervix uteri.</i>	The sphincters, the expulsors, the ejaculators, the Fallopiian tubes, the uterus, &c. }	

Tone and irritability of the muscular system.

256. The first two columns of the foregoing table are taken, with slight alterations, from Dr. Marshall Hall's work, "On the Diseases and Derangements of the Nervous System;" the third column is added from a subsequent table, showing the physiology of the true spinal system, with many transpositions and some additions, the excited actions being placed opposite to those divisions of the first two columns with which they have the most obvious connection. The excited actions

in the third column are not produced by irritation of the incident nerves of the first, but correspond more closely with the excited action of the reflex motor branches of the second column. Thus, the incident motor branches of the nostrils, when irritated, will produce not merely the facial respiratory movements, but will also throw the muscles of respiration into violent action. So, likewise, irritation of the bronchial incident nerves will excite not merely the muscular fibres of the bronchial tubes, but the muscles of expiration, also, in the act of coughing.

257. The following table presents the pathology of the true spinal system, according to Dr. Marshall Hall :

PATHOLOGY OF THE TRUE SPINAL SYSTEM.

Diseases of the Incident Nerves.

- | | | | |
|-------------|--------------|---|---|
| I. Dental | } Irritation | { | 1. Crowing inspiration. |
| Gastric | | | 2. Strabismus, spasm of the fingers and toes, |
| Intestinal | | | strangury, teneamus, &c. |
| | Infants. | { | 3. Convulsions. |
| | | | 4. Paralysis. |
| II. Gastric | } Irritation | { | 1. Hysteria. |
| Intestinal | | | 2. Asthma. |
| Uterine | | | 3. Vomiting, hiccough, &c. |
| | Adults. | { | 4. Epilepsy. |
| | | | 5. Puerperal convulsions, &c. |
- III. Traumatic tetanus, hydrophobia, &c.

Diseases of the Reflex or Motor Nerves.

SPASM.

- a. Spasmodic tic.
- b. Torticollis.
- c. Contracted limbs, &c.

II. PARALYSIS.

Diseases of the Spinal Marrow itself.

- I. Inflammation and other diseases.
- II. Diseases of vertebræ and membranes.
- III. Counter pressure, &c., in diseases within the cranium.
- IV. Centric epilepsy, tetanus, &c.
- V. Convulsions from loss of blood, &c.*

258. The condition of the nervous system and that of other functions of the body reciprocally affect each other; but this mutual dependence is so strikingly displayed in the case of the circulation and the nervous centers, as to merit a separate consideration in this place.

259. The effect of the emotions and passions, and of all violent exertions of the body, on the heart, is a matter of daily observation; and so surely does the circulation participate in

* For an exposition of Dr. Marshall Hall's views, see "On the Diseases and Derangements of the Nervous System, in their Primary Forms, and in their Modification by Age, Sex, Constitution, Hereditary Predisposition, Excesses, General Disorder, and Organic Disease. By Marshall Hall, M.D., &c. 1841;" or Med. Chir. Review, Oct., 1841.

every change of the nervous system, that it becomes the best test of the degree and amount of that change. Every violent exertion of different muscles, and every long-continued exercise of the same muscles, strongly excites the pulse; and rest not only restores it to the frequency which it had before the effort, but for a time reduces it below that number. The various causes of excitement to which the body is exposed during its waking hours, affect the circulation in the same way. It is in consequence of the fatigue produced by these causes that the pulse falls toward evening, and regains its frequency when the body has been refreshed by sleep. Precisely the same effects are produced by disease. In febrile affections, for instance, the pulse, during the height of the disorder, is much more frequent than in health, but as soon as the disease has passed away the pulse falls many beats below its natural frequency, to regain that frequency again as health and strength return. Another remarkable fact, established by careful observation of the pulse, is, that the body is much more affected by all causes of excitement when it is in full possession of its strength, than when it is exhausted by fatigue. Thus, all stimuli—muscular exertion, food, drink, and even mental application—produce a much greater effect on the circulation in the morning than at night, and not only a greater effect, but one of much longer continuance. So, also, if two persons be submitted to the same stimulus, the pulse of the stronger will be most affected by it; if a healthy man, and one just convalescent from fever, take the same food, the circulation of the healthy man will be most accelerated.

260. But there are states of debility in which the heart's action, in place of being less frequent, is more frequent than in health. This occurs in a more advanced stage of convalescence, when the patient begins to recover his strength, and also in the decline of febrile affections, so long as any degree of fever continues. In this state, stimulants have the effect of lowering the pulse; the action of stimulants, therefore, becomes a useful test of the condition of the patient. A greater degree of debility in the absence of actual disease is characterized by a very small and very frequent pulse; but such debility is rarely met with, except as the consequence of diminution in the quantity of the circulating fluid, whether from excessive loss of blood or from increased discharges.

261. When exhaustion of the nervous power is accompanied by local disease, whether functional or structural, that state of system exists to which the name of *irritation* is given. Irritation is observed in cases of slow convalescence from fever, in which some local affection has supervened; as an immediate consequence of severe injuries in subjects debilitated by

previous disease or bad habits of life, and as a more remote consequence in sound constitutions. In these latter cases the injury itself produces the same nervous exhaustion which bad habits or previous disease had occasioned in the former.

262. Another effect of the nervous system on the circulation is *syncope*. This, which consists in a temporary arrest of the heart's action, may be caused by any violent shock sustained by the nervous centers, originating from without, as in accidents, or within the brain itself, as in the case of fainting from violent emotions. Sometimes the heart is paralyzed by the shock, and death is the result.

263. There is still one other mode in which the nervous centers act upon the circulation. When blood or serum is effused upon the brain, the heart is remotely affected, and the same result follows a similar injury to the upper portion of the spinal cord. In these cases, the heart beats less frequently than in health. The heart is also affected in the same way in some cases of hysteria. Here the cause is more obscure.

264. The effect produced upon the nervous centers by changes in the state of the circulation is more important even than those which the circulation suffers from alterations in the state of the nervous system. The exhaustion which follows on strong nervous excitement has its counterpart in the exhaustion produced by loss of blood. The sudden loss of a large quantity of blood produces syncope or death, partly by depriving the heart of its due amount of stimulus, and partly by paralyzing the nervous centers. The abstraction of a small quantity may give rise to the same state of debility which follows upon febrile affections, but this can only take place where the frame is quite free from local disease, whether functional or structural.

265. When the loss of blood is occasioned by a severe wound, or occurs in a person affected with local disease, or of a broken constitution, the debility is accompanied by some nervous excitement, and *irritation* is the consequence. The same effect follows when the quantity of the circulating fluid is diminished by profuse discharges, as leucorrhœa, diarrhœa, &c. In all these cases there is some local affection: in the case of the wound, inflammation and its consequences; in the case of the broken constitution, some visceral disease; in leucorrhœa, diarrhœa, &c., some local disturbance; and in all these cases the state of debility is exchanged for that of irritation. An excessive and continued drain of natural secretions, as in menorrhagia, and in prolonged suckling, leads to the same result. The puerperal state, combining, as it does, nervous exhaustion, loss of blood, a local affection, and a sudden change of the equilibrium of the fluids, presents the

most vivid picture of that state to which the name of irritation has been given.

266. In this condition of irritation, as in that originating in the nervous centers themselves, we have the frequent and quick pulse easily excited by mental emotion or by strong and sudden impressions on the organs of sense, and this is accompanied by a great variety of nervous affections. The functions of the brain itself suffer; and we have, according to the degree of the irritation, mental excitement, delirium, or mania; the nervous influence conveyed to the muscular system betrays the same derangement under the forms of restlessness, jactitation, convulsions, and spasms in the voluntary muscles, and frequent or irregular breathing, laughing, crying, sighing, sobbing, yawning, &c., in the muscles of respiration; the nerves of sensation, participating in the general derangement of the nervous system, may become unusually acute, giving rise to an intolerance of light and sound, and an excessive sensibility of surface. The stomach likewise sympathizes with the nervous centers, and there is nausea, vomiting, hiccough, &c.

267. Such are some of the phenomena of the state of irritation; a state which, whether it originate in the nervous system or in the circulation, displays nearly the same character, and requires the same treatment. It is aggravated by depletion, and relieved by those remedies which impart strength while they soothe excitement. A combination of narcotics and tonics, or of narcotics and stimulants (for stimulants act as tonics in such cases), is the remedy indicated, and opium fulfills this indication better than any other.

268. The influence of the nervous system over muscular movements has already been alluded to; and two classes of movements have been described, the involuntary and the voluntary: the former excited by certain changes in the condition of the incident or excitor nerves giving rise to corresponding changes in the reflex or motor nerves, and the latter by the will. In health, these two sets of muscles execute their appropriate movements; in disease, or in peculiar states of system, the one takes on the character of the other, the involuntary muscles obeying voluntary impulses, and the voluntary muscles performing involuntary contractions.

269. A well-authenticated example of involuntary muscle being subject to the influence of the will, occurred in the case of Colonel Townsend, who possessed the extraordinary faculty of stopping the beat of his heart at will. This case is nearly unique. But examples of the voluntary muscles being subject to other influences besides those of the will are both numerous and varied. The associated reflex movements of vol-

untary muscles, produced by an influence transmitted from the peripheral extremity of an incident nerve to the spinal marrow, have already been mentioned. Some of the most striking examples of involuntary actions of voluntary muscles observed in disease are, chorea, hysteria, epilepsy, catalepsy, convulsions, tetanus, hydrophobia. Of these diseases, some depend on a direct influence transmitted from the nervous centers, but the majority are examples of a reflex action.

270. When the contractions continue in the same muscles for a certain space of time, producing a fixed and rigid state of the parts affected, they are said to be *tonic*; when the muscles are alternately contracted and relaxed, they are called *clonic*. Tetanus, hydrophobia, and catalepsy are examples of *tonic* spasm; chorea, hysteria, and epilepsy are forms of *clonic* spasm: convulsions are sometimes of one kind and sometimes of the other.

271. In chorea and hysteria, voluntary and involuntary impulses are strangely blended; but the degree of control which the will exercises is widely different in the two cases. When a patient affected with chorea wills a movement, the involuntary action, mixing with the voluntary effort, causes grotesque distortions, and attempts at restraint only increase the action of the muscles; but the movements of the hysteric patient are less grotesque, and can be restrained by a strong effort of the will.

272. Convulsions afford an example of unmixed involuntary contraction. They are commonly a form of reflex action: but when they follow the loss of blood, there is reason to believe that they arise from the sudden removal of that nervous influence which maintains the tone and the equilibrium of the muscles. As soon as this is withdrawn, the flexors, which are the strongest, contract, and the extensors, being put on the stretch, are, in their turn, brought into action, and thus an alternate or clonic contraction of the two sets of muscles takes place: but as there is a balance of strength in favor of the flexor muscles, they at length overpower the extensors, and, if death ensue, the fingers and toes are found flexed. Convulsions, therefore, are often the last movements of a living body; they are also the most efficient cause of restoration from syncope; for when the circulation has nearly ceased, and the heart does not receive blood enough to excite it to action, the contraction of the muscles of the limbs forces the blood of the veins toward the heart, and thus tends to re-establish the circulation. The trembling of the limbs from cold, which is a low degree of convulsion, has the same beneficial effect in restoring the circulation of the blood.

273. The nerves of sensation, like those of voluntary mo-

tion, are subject to various derangements. Sensation may be lost (anæsthesia), or exalted (hyperæsthesia), or perverted (dysæsthesia). The loss of sensation which sometimes accompanies paralysis of the voluntary muscles is an example of anæsthesia affecting the nerves of touch; and amaurosis, of anæsthesia of the optic nerve. Intolerance of light and sound, and violent hunger and thirst, are examples of hyperæsthesia. The various kinds of pain, and the anomalous sensations of hysteria and hypochondriasis, are instances of dysæsthesia. In some hysteric females there appears to be diminished sensibility of the nerves of touch, with increased sensibility of other nerves, the sensibility appearing to be withdrawn from the one to be concentrated in the other. Hence some of the most remarkable phenomena of nervous affections, and of that state induced by the manipulations of the magnetizer.

274. There still remain to be considered two functions closely dependent upon the nerves, though connected more or less with the changes which are constantly taking place in the fluids and textures of the frame: the generation of heat and electricity.

275. *Animal Heat*.—The cause of animal heat is still a subject of controversy; but the experiments of Depretz and Dulong, as recently interpreted by Liebig,* have rendered it in the very highest degree probable that the production of animal heat is entirely due to the combination of the carbon and hydrogen of the blood with the oxygen of the air in the process of respiration. It has also been shown, experimentally, that the nerves exercise an important influence upon the temperature of the body. Though the precise effect which each of these causes has in the production of animal heat has not been determined, observation has shown that its amount varies greatly in different states of the system.

276. The temperature of those internal parts of the body which are most accessible, viz., the mouth and rectum, is about $97\frac{1}{2}^{\circ}$ or $98\frac{1}{2}^{\circ}$ Fahr. A difference, however, has been observed to exist in parts near to and remote from the center of the circulation; thus, Dr. J. Davy observed, that the temperature of the axilla being 98° Fahr., that of the loins was $96\frac{1}{2}^{\circ}$, that of the thigh 94° , that of the leg 93° to 91° , and that of the sole of the foot 90° . The temperature of the blood is about 101° .

277. In disease, remarkable deviations from the standard have been observed both in excess and in defect. Thus, the temperature of inflamed parts has been found as high as 105° to 107° , and that of the whole surface has reached the same

* See a paper by Liebig, on Animal Heat, in the *Lancet*, Feb. 22, 1845.

degree in some cases of fever, and risen still higher (to 112°) in scarlatina. On the other hand, in cases of morbus caruleus and in the cholera, the temperature has been observed as low as $77\frac{1}{2}^{\circ}$ or 77° . In most cases of disease the increase and decrease of temperature bear a pretty exact proportion to the rapidity or slowness of the circulation; but remarkable exceptions to this rule have been observed. Thus, Dr. Hastings, in his work on inflammation, states, that in several cases of fever the pulse has been remarkably infrequent, while the temperature has been very high; the pulse, for instance, being 45 when the temperature of the body was 105° . In cases of hydrocephalus the same observer has counted a pulse of 60° or 70° , with a temperature of 100° .

278. *Electricity*.—The facts ascertained with regard to free electricity in man are the following: As a general rule, the electricity is positive, but in the female more frequently negative than in the male; it is more abundant in persons of a sanguine temperament than in the lymphatic, greater in the evening than in the morning; greater when the temperature of the body is high than when it is low; it is increased by spirituous liquors, and reduced to zero in rheumatic affections. The free electricity of the body is generally of very feeble intensity, but in peculiar states of system the body has given out sparks in great abundance.

THE MIND CONSIDERED MORE ESPECIALLY IN ITS RELATION TO THE BODY.

279. The *Brain*, considered as the material instrument of the mind, deserves attention, inasmuch as it differs in important particulars from all other viscera. Those of the abdomen are contained in a yielding cavity with muscular parietes, those of the chest in a cavity consisting partly of bone and partly of muscle, but allowing of a considerable increase and diminution of size in all directions; but the brain is shut up in an unyielding cavity of bone. All these cavities are air-tight, but that of the cranium alone is both air-tight and unyielding, at least in the adult. It follows, then, that while all the cavities of the body must always be full, the cranium alone must always contain the same amount of matter, for the atmospheric pressure of 15 pounds on every square inch of the surface of the body keeps the brain full, as it does a siphon. Now the brain consists of a mass of nervous matter, supplied with blood by a large number of vessels, and there is no reason to believe that this matter can suffer compression any more than so much water, at least the strongest pressure which can be exerted upon it in the living body would probably not be perceptible to the most delicate instrument. It is also an un-

doubted fact, that so long as the arteries and veins contain their due proportion of blood, the brain is not affected either by an increase or diminution of the pressure which it ordinarily sustains. A man who descends in a diving bell thirty-four feet below the surface of the water sustains an additional pressure of 15 pounds on every square inch of his body, and yet his brain does not suffer. On the other hand, a man ascending a lofty mountain, or going up in a balloon, has the pressure on his body, and, consequently, on the vessels of his brain, materially diminished, and yet his brain is not affected. Thus, the inhabitants of some of the valleys among the Andes, who live as far above the sea as the summit of Mont Blanc, suffer only half the pressure which the body has to bear at the level of the sea, and yet they enjoy health both of mind and body. Again, the head of the infant suffers severe pressure during birth, and the yielding cranium of the child allows of large accumulations of fluid, and yet the brain suffers nothing during birth, and often very little in hydrocephalus.

280. Mere pressure, then, does not affect the functions of the brain, and yet men are said to die of pressure on the brain. When blood, or serum, or lymph is found on the surface or in the ventricles, or a tumor in the substance of the brain, or a larger quantity of blood than usual in some of its vessels, death is said to have been occasioned by pressure. This statement is incorrect; pressure there is none. How, then, is the fatal result to be accounted for? Simply thus: the brain, like all other organs of the body, is dependent for the due performance of its functions on its supply of blood, and a tumor or fluid within the cranium, by occupying space there, deprives the brain of a quantity of blood equal to its own size; and the functions of the brain suffer in proportion to the loss which it sustains. The functions of the brain most open to observation are voluntary motion and sensation, both of which are lost or greatly impaired. The less obvious functions—that is to say, the supply of nervous power to the more important viscera, especially those of circulation and respiration—are equally impaired: hence the infrequent pulse and respiration.

281. Loss of sensation and voluntary motion, and infrequent pulse and respiration, are among the most prominent symptoms of apoplexy; and all the others, whether occasional or constant, admit of the same ready explanation. When the supply of blood is cut off at once, as by the sudden pouring out of blood in the more common form of apoplexy, the symptoms are often more strongly marked, though the quantity of blood effused is very small, than in cases of slow effusion of fluid or the slow growth of tumors within the cranium, in which cases the brain adapts itself by degrees to the new circumstances in

which it is placed. Sometimes the quantity of blood effused is too small to account for the serious disturbance of the functions of the brain by the mere displacement of a few drops of the circulating fluid. Of these cases there is a ready explanation in the fact that instances have occurred in which all the symptoms of apoplexy have been present without a single morbid appearance after death, except a disproportionate quantity of blood in the veins; and it is highly probable that the cases of apoplexy now alluded to combine with the small effusion of blood this same want of balance in the circulation. If the fatal effects of such small effusions of blood appear inexplicable on this supposition, they are to the full as difficult of explanation on the received principle of pressure. The intimate connection which exists between the vessels within the brain and those of the scalp and face, is sometimes a source of relief and safety in sudden determination of blood to the head. The flushed and turgid face which accompanies apoplectic seizures is a familiar illustration of this fact.

282. There are cases of apoplexy, then (that is to say, cases in which the functions of the brain are greatly impeded), in which no other cause can be assigned but a want of balance in the circulation. Is this a sufficient cause? Without doubt it is. Suppose the extreme case that the arteries contain scarcely any blood, while the veins are full of it; it is obvious that the brain is in as bad a condition as if it received no blood at all, or its vessels were filled with warm water. When the venous blood is less decidedly in excess, the functions of the brain, of course, suffer less; and these slighter disturbances in the balance of the two circulations probably account for the various conditions of the mind in our waking and sleeping hours. On the other hand, if the circulation through the arteries be increased, instead of torpor of the functions of the brain, we have those of excitement, heightened sensibility, strong muscular contractions, violent delirium, raving madness, &c.

283. This balance of the circulation may be disturbed in various ways. Blood may be accumulated in the veins by pressure upon the jugular veins or on the carotid arteries. As the change of arterial into venous blood is constantly going on, an arrest of the circulation in either direction will have the effect of increasing the quantity of venous blood in the brain, and this will be followed by sleep, more or less profound, by coma or apoplexy. Pressure, then, is one disturbing cause. An arrest of the heart's action, by putting a stop at once to the circulation through the brain, produces syncope, which differs from apoplexy merely in degree, the one arresting every function of the body, the other merely op-

pressing them more or less. A very feeble action of the heart will be attended with the same result ; for the arteries of the brain receiving little blood, and the change from arterial to venous blood still going on, the brain must contain but a small quantity of arterial blood, and must consequently perform its functions imperfectly. Hence the deep sleep, or coma, which often attends extreme debility, and hence the turgid condition of the veins of the head when death follows upon hæmorrhage or other debilitating cause. In these cases, however, an effusion of serum generally accompanies the turgescence of the veins.

284. The incautious use of the lancet in cases of inflammation of the brain often produces this very derangement of the circulation. The bold practitioner, not content with reducing the circulation through the arteries and veins to a state of equilibrium, carries depletion to the extent of greatly diminishing the quantity of the circulating fluid, and enfeebling too much the action of the heart. The consequence is, that the arteries receive little blood, the veins contain an undue proportion, the circulation through the brain becomes languid, the capillaries lose their elasticity, and pour forth serum into the ventricles or on the surface, and the patient dies comatose. Increased action of the heart, on the other hand, causes the brain to receive an undue proportion of arterial blood ; hence the delirium and other symptoms of violent excitement which attend severe inflammation and inflammatory fevers.

285. All the organs of the body require, for the due performance of their functions, that the blood should traverse them with a certain degree of rapidity ; a sluggish circulation, therefore, is attended with sluggish functions. This observation, of course, applies to the brain in common with all other parts of the frame : the effect, therefore, of a sluggish circulation through that organ will be a torpor in the functions which it performs ; this torpor constitutes, according to its degree, sleep or coma.

286. *Sleep* comes on for the most part at that period of the day, and in that posture, in which the circulation is the most sluggish, viz., at night and in the horizontal posture. Now it has been already stated that, as a general rule, the pulse falls toward evening, and it may be added, that it is less frequent in the horizontal than in the erect position of the body. These two circumstances, then, which favor a slow circulation of the blood, also favor sleep, and partly explain its occurrence. But other causes must be taken into account, as the darkness and silence, the absence of the usual impressions on the senses, and the exhaustion of the nervous system. This exhaustion reacts upon the circulation, and the circulation, in its

turn, reacts upon the brain. Sleep, then, may be considered as due partly to exhaustion of the nervous system itself, partly to the absence of impressions on the organs of sense, and partly to the languid circulation through the brain. The negation or absence of any of these conditions produces wakefulness. Intense cold, which is another familiar cause of sleep, probably acts, partly by causing an accumulation of blood in the interior organs of the body, and partly as a direct sedative. A languid circulation through the brain will result in either case. In the cold stage of ague the same state of circulation exists, and the same condition of brain. When this is of long continuance or of great severity, deep sleep or coma occurs.

287. Among other causes of this state may be mentioned repletion, and a certain stage of intoxication. The sleep which follows full meals may, perhaps, be explained by the circulation through the brain of the products of digestion not yet fully converted into blood; spirituous liquors act as a poison, stimulant in a small dose, and narcotic in a larger one.

288. The circulation through the brain varies much with the posture of the body. In the erect posture the heart, in sending blood to the brain, has to oppose the force of gravity, but in the horizontal posture the heart has but little resistance to overcome. Hence, when the heart is feeble and the system drained of blood, a sudden change from the recumbent to the sitting or erect posture will sometimes cause fatal syncope; and, on the other hand, a patient who has fainted in the erect posture, is soon restored by being laid on the back. When the head is dependent, the return of the venous blood to the heart is opposed by gravity; the balance of the circulation is therefore destroyed, and coma is threatened. Thus, apoplexy has been sometimes induced by sudden stooping, as in the act of tying a shoestring.

289. The fact, that the flow of blood to the head is favored by the recumbent, and retarded by the erect posture, suggests the treatment to be adopted in cases of disease of the brain. Where there is high arterial action, the head should be raised; where there is much debility, the body should be placed horizontally. Such changes of posture are often attended with the best effects: thus, instances are recorded in which pain, intolerable in the horizontal posture, has been at once removed by assuming the erect position. When it is desirable to produce a sudden and strong effect on the system by the abstraction of blood, the patient should be placed in the erect posture, for the heart soon loses the power of sending blood upward to the brain, and fainting follows as a consequence.

290. Cerebral excitement is directly opposed to the states

of sleep and coma, and arises from an opposite state of the circulation through the brain. The degree of violence displayed bears a pretty exact relation to the rapidity and force with which the arterial blood is circulated, and to the strength of the patient. In the strong and robust, the outward manifestations of the disturbance which the brain is suffering are violent, and the muscles contract with great force; but if the strength is much exhausted, the loud talking of furious delirium is exchanged for low muttering; the violent muscular efforts for subsultus tendinum; and the distinct impressions on the senses for the *muscæ volitantes*.

291. The mind, acting through the brain as its instrument, exercises an important influence on the body. Some of the modes in which this influence is displayed have already been alluded to. It only remains to present the subject in a more connected form.

292. In speaking of the nervous system, two classes of nerves have been described—those of sensation and those of voluntary motion. To these correspond two orders of mental faculties, the intellectual and the affective. Sensation, perception, thought, judgment, imagination, are operations of the intellect. Love, fear, hope, ambition, pride, vanity, &c., belong to the passions or emotions. A law of association governs both, and each is subject to the influence of habit.

293. As the intellectual faculties become possessed of the materials of thought solely through the senses, it is upon the senses that they react; but as the emotions and passions aim at their own gratification through the agency of the will on the voluntary muscles, or prompt to action as an escape from threatened evil, it is in them that they display their power. Hence the influence of the intellect on the body is much less than that of the emotions. Of the intellectual faculties, the imagination is that which has the strongest affinity with the emotions and passions, for its operations, like theirs, are attended by excitement. It seems, indeed, to hold a middle place between the intellect on the one hand, and the passions on the other; adding vigor and originality to thought, while it lends attraction to the objects of desire, and gives intensity to every effort by which they can be compassed. Hence the two-fold power of imagination.

294. Imagination is the only intellectual faculty which exercises a direct influence on the bodily organs; those organs being, as already stated, the organs of sense. It acts by producing in them, or in the parts of the brain with which they communicate, the same state which is usually brought about by external objects actually present to them. All the organs of sense—the eye, the ear, the nose, the palate, the skin—

may become the theater of these false impressions, but the eye is the most liable to be affected by them. These false impressions on the organ of vision are called *ocular spectra*, or *spectral illusions*.

295. *Spectral illusions* occur in many different states of system, and vary in their intensity. Sometimes they occur to imaginative persons in perfect health, sometimes to persons suffering from indigestion, or debilitated by long illnesses, or after mental excitement, or in consequence of suppressed discharges. They have every degree of intensity, from a flash of light, a circle of colors, or an indistinct outline, to a perfect picture not readily distinguishable from that produced by a real object. In some instances, they can be called up at will; in some, they are quite involuntary; and in others, they are partly involuntary and partly subject to the will. Müller states that in his case they are involuntary; the poet Goethe could call them up by an effort of the will, but had no power over them when once produced.* Several interesting cases of ocular spectra, so closely resembling real objects as not to be distinguished but by the most careful exercise of comparison and judgment, are related by Sir David Brewster, in his work on Natural Magic, and by Sir Walter Scott, in his "Demonology and Witchcraft." That of Nicolai, the Berlin bookseller, is not the least remarkable, and was distinctly traced to the suppression of an habitual discharge of blood by hæmorrhoids, the immediate exciting cause being a violent fit of passion.

296. During sleep, false impressions on the senses are of frequent occurrence, and constitute dreams, which have the air of reality, from not being corrected, as in the waking state, by the judgment. Dreams are often accompanied by actions of the voluntary muscles, and persons talk or walk in their sleep. The actions, in these cases, are in conformity with the train of thought passing through the mind, and the senses are active only within the circle of those thoughts. This is somnambulism.

297. In mania false sensations are of frequent occurrence, are believed as realities, and are interpreted according to the

* See Müller, part vi., p. 1397. I may here state, that when a feeble and sickly child, I possessed the power of creating ocular spectra at will in a very remarkable degree. I could design on the dark ground, and on a small scale, any picture, however complicated, filling in object after object with all the outlines and colors true to nature. During this period, my imagination was uncommonly active in sleep, occasioning dreams of the most fearful kind. As my health improved, I lost this power of creating images at will, and since my seventh year have never regained it, though I have suffered occasionally from false impressions on the sense of hearing.—Ed.

delusion which exists, thus becoming compound delusions. The madman believes in the reality of these sensations, because he has lost the faculty of comparison, and in as far as such sensations constitute madness, belief is the test of its existence. The essence of all aberrations of intellect is a belief in the reality of the workings of the fancy; belief, therefore, becomes the chief test of intellectual mania.

298. The influence of the passions and emotions on the body is much more extensive than that of the imagination; for the imagination, in the strict sense of the term, and acting without the passions, affects only the organs of sense, while the passions, acting with, or excited by, the imagination, influence not the senses only, but almost every part and every function of the body. Thus, fear, acting through the imagination, creates false sensations; as in the curious case of a thief to whom, in common with other suspected persons, a stick of a certain length was given, with the assurance that the stick of the thief would grow by supernatural power. The culprit, imagining that his stick had actually increased in length, broke a piece off, and was thus detected. A similar anecdote is told of a farmer who detected depredations on his corn-bin, by calling his men together, and making them mix up a quantity of feathers in a sieve, assuring them, at the same time, that the feathers would infallibly stick to the hair of the thief. After a short time, one of the men raised his hand repeatedly to his head, and thus betrayed himself.

299. It is unnecessary to multiply examples in proof of the influence of the emotions on the senses. The power which they exercise over the secretions is equally well known. The Indian method of detecting a thief, by causing all the suspected persons to chew a portion of rice and to spit it out upon a leaf, is a familiar illustration of this. The anxiety of the culprit arrests the flow of saliva, and the unmoistened rice convicts him. In the greater number of instances, however, the effect of the emotions is to increase the secretions; thus, fear causes diarrhœa and profuse perspiration; anxiety increases the flow of urine; both grief and joy that of the tears.

300. The effect of the emotions on the muscular system is strongly marked. The exciting passions cause laughing, crying, sobbing, &c., with spasmodic contraction of the features, and they give strength to the muscles; the depressing passions, on the contrary, as terror, paralyze the muscles of the face and of the entire body, including the sphincters. The influence which the emotions, whether exciting or depressing, have upon the entire circulating system, from the center to the extreme capillaries, has already been alluded to; their

long-continued effect accounts for the diminished nutrition attendant upon anxiety and over-exertion of the mind, and is marked in the pallid aspect of the hard student, or man of business.

301. The cure of ague, paralysis, &c., by a strong impression on the imagination, evinces still more strongly the power of the mind over the body.

302. The reaction of the body on the mind is a subject of much interest, but of too great extent to receive more than a passing notice in this place. Melancholia, hypochondriasis, and hysteria are instances of the effect which the important organs of the body, especially those of the abdomen and the uterine system of the female, have upon the mind. The same local irritation which, confined to the spinal marrow, impairs or altogether perverts the action of the voluntary muscles, seems, when it extends to the brain, to rob the higher faculties of the mind of their usual control over the imagination, and to give rise to states of intellect closely bordering on insanity; witness the extraordinary deceptions practiced by the hysteric female, and often persevered in at the expense of pain and privation, under which nothing short of a strong delusion could support her.

303. To complete this outline of physiology and general pathology, it would be necessary to say something of the generative system, especially in the female. Some of the disorders of that system, as far as they react on the general health, have already been glanced at; the narrow limits of this work prevent more minute details. Some important portions of physiology, which have been but cursorily mentioned in the present sketch, will be more carefully and minutely examined in the following chapters.

CHAPTER III.

EXAMINATION OF THE MORE IMPORTANT SYMPTOMS AND SIGNS OF DISEASE.

THE subjects contained in this chapter are arranged nearly in the order in which they were treated in the former. They are the following: Examination of the blood and urine; of the abdomen and chest; of the pulse and respiration.

THE BLOOD.

304. It is usual to examine the blood after an abstraction by bleeding, with a view to a more accurate knowledge of the state of system in which the remedy was prescribed. The

appearances supposed to indicate the existence of inflammation, to justify the past abstraction of blood, and to warrant a fresh recourse to the lancet, are a buffed surface or coat, and a cupped appearance. When the blood presents both these characters, it is said to be *buffed* and *cupped*. It is of great importance to understand the nature and causes of this peculiar arrangement of the different parts of the blood, as this knowledge will go a great way in deciding the question whether it is or is not a sign of inflammation.

305. The buffy coat has been proved to depend on the existence of a layer of liquor sanguinis free from red globules on the surface of the clot; the hollow or cupped appearance arises from the strong contraction of the fibrin of this portion of liquor sanguinis. Hence the buffy coat must depend upon the more or less complete separation of the liquor sanguinis from the other portions of the blood, and the cupped appearance upon the force with which the fibrin contracts.

306. According to this view, the formation of the buffy coat may be brought about by more causes than one. If the red globules retain their natural specific gravity, while that of the liquor sanguinis is diminished, or if the red globules have a greater specific gravity than usual, while the liquor sanguinis has its normal density, the red globules will sink rapidly, and the separation between the upper and lower parts of the clot will be complete. The opposite conditions of the two portions of the blood will, of course, produce opposite results. If, while the contractility of the fibrin remains the same in two cases, the quantity is increased in one and diminished in the other; the clot will be large in the one case and small in the other; on the other hand, if the quantity of fibrin remaining the same in two cases, the contractility is great in the one and small in the other, we shall have the cupped appearance in the former, while the surface of the clot will remain comparatively flat in the latter. The thickness of the buffed surface will depend upon the quantity of the liquor sanguinis which has separated from the rest of the clot; and this quantity will vary with the time which elapses before the fibrin begins to contract. The slower the coagulation, therefore, the thicker the buffy coat. A great diminution in the quantity of the red globules will, of course, favour the complete separation of the liquor sanguinis. Hence this may be a cause of the buffy coat.

307. In the process of coagulation, then, there are two stages or steps: separation of liquor sanguinis, and contraction of fibrin. The quantity of the liquor sanguinis, and the consequent thickness of the clot, will vary directly as the rapidity of the coagulation and the comparative density of the globules: the surface of the clot will be flat or hollow as the contraction

of the fibrin is more or less firm, and the entire clot will be large or small as the quantity and contractility of the fibrin is increased or diminished. If the contractility is slight, the serum will be imperfectly pressed out of the liquor sanguinis, and the serum and red globules from the remainder of the clot; if, on the other hand, the fibrin contracts strongly, it will diminish the size of both portions of the clot. It is because the upper part of the clot consists entirely of liquor sanguinis, while the lower contains all the elements of the blood (liquor sanguinis and red globules), that the upper portion is always smaller than the lower; hence the clot is not unlike a cupping-glass in shape.

308. The separation of the liquor sanguinis and the degree of contraction of the fibrin, which so greatly modify the appearance of the clot, are themselves influenced by a variety of causes. Thus the separation is more complete, and the buffy coat, *ceteris paribus*, more strongly marked when the blood is drawn in a full stream into a deep vessel: the reverse takes place when the stream is slow and the vessel shallow. The temperature of the blood itself, and of the place in which it is kept, also exerts an influence, warmth being favorable to its complete separation. The size of the stream and the depth of the vessel probably affect the separation by retaining the warmth for a longer or shorter period.

309. The contraction of the fibrin is strongly influenced by the shape of the vessel in which the blood is drawn. Thus, in one experiment performed by Dr. Babington, the clot formed in a pear-shaped vessel weighed scarcely half that formed from the same blood in a common pint basin; that is to say, the fibrin contracted more firmly, and pressed out a larger quantity of serum and red globules in the former case than in the latter.

310. Seeing that such slight causes can influence the formation of the clot, it is scarcely to be expected that much reliance should be placed on the cupped and buffed appearance of the blood as a sign of inflammation, unless great precautions are used to insure an accurate resemblance of one observation to another in every respect. The value of this sign, however, must be decided by an appeal to facts; and for these we are indebted to M. Andral.* The following table presents the results which he obtained from a large number of observations. The results are here stated in per centage proportions:

Acute rheumatism and pneumonia: well-marked buffy coat in	93 per cent.
Acute amygdalitis (cynanche tonsillaris)	75
Pulmonary tubercle	69
Chlorosis	64

* Gazette Médicale, and Med. Chir. Rev., Oct., 1841.

Lead colic	30 per cent.
Bronchitis (including capillary bronchitis)	28
Pleuritic effusion	26
Chronic rheumatism	22
Hypertrophy of the heart and intermittent fever	15
Cerebral congestion	13
— hæmorrhage	9
Typhoid fever (uncomplicated with pneumonia)	} 0
Albuminuria	
Rubeola and scarlatina (uncomplicated with nephritis)	

311. It will be observed that the first four diseases on the list are those which have been already shown (sec. 112) to be accompanied with a positive increase of fibrin, while chlorosis is characterized by an excess of fibrin as compared with the quantity of the red globules. Hence, then, the existence of the buffy coat may be assumed to depend either on an absolute or relative increase of fibrin. Andral also states, that when the blood contains fibrin in excess, coagulation goes on more slowly than when it is deficient. "The increase of the relative proportion of the fibrin to the globules may occur in two conditions: 1. The quantity of the globules being normal, that of the fibrin may rise from 3 or 4, the standard in health, to 10; under such circumstances the formation of the buffy coat is uniform and constant, its thickness and consistence being proportionate to the excess in the relative quantity of the fibrin. This is the case in all the genuine phlegmasiæ, in which there is a real and absolute increase of the fibrin. 2. The quantity of the fibrin may be normal, but that of the globules may be considerably reduced. Now in this case, although there is no absolute excess of the fibrin, a genuine and well-marked buffy coat, with retracted and puckered edges, may be formed on the blood, although there be no inflammatory disease present. Hence we observe the phenomenon in the blood of chlorotic girls."

312. The mere presence of the buffy coat, therefore, is by no means an indication of the existence of inflammatory action; all that it indicates is, that there is an alteration in the relative quantities of the fibrin and the red globules, or an excess, either absolute or relative, of the fibrin. The fact that the buffy coat may occur in diseases not characterized by acute inflammation, as in the second and third divisions of the table, should put us on our guard against placing too much reliance on the phenomenon as a sign of pre-existing inflammation sufficiently severe to justify the further abstraction of blood.

THE URINE.

313. Healthy recently-voided urine is transparent, of a light amber color, and of an aromatic odor. It has a bitter taste

and a slight acid reaction. As it cools it loses its aromatic odor, and assumes a smell which has been called *urinous*. After exposure to the air for a few days, the urine acquires an ammoniacal odor and an alkaline reaction, a white slimy pellicle forms on its surface, and small white crystals of phosphate of ammonia and magnesia are deposited on the sides of the vessel.

314. *Quantity voided in twenty-four Hours*.—This varies in different persons, and in the same person at different times and under different circumstances. The following are the estimates of authors: Haller, 49 ounces; Keill, 38 ounces; Prout, 32 (30 ounces in the summer, and 40 in the winter); Christison, 35 ounces; Rayer, 21–57 ounces; Dr. Dalton's experiments on his own person give 48½ ounces (month of November), 51½ (month of June). The average of these experiments and estimates is about 41 ounces. Cold climates and cold weather increase the quantity; hot climates and hot weather diminish it. It is greater during the day than at night. The total quantity of urine is more than half the solid and liquid ingesta. The solid contents of the urine amount to about 6⅔ per cent., and the quantity of solid matter voided daily amounts to 2½ ounces avoirdupois. Of this 1½ ounces consist of urea.

315. The quantity of the urine is also increased whenever the pulmonary and cutaneous transpiration is suppressed, in the cold stage of intermittent fever, under the influence of strong nervous excitement, and in hysterical and hypochondriacal paroxysms. In such cases, the character of the urine is not changed, the quantity of water only being increased. This increase, without any change in the composition of the urine, may amount to 30 or 40 pints daily. The quantity of the urine may also be increased with a deficiency or with an excess of urea, or it may contain sugar, as in diabetes mellitus, or chyle. The quantity is diminished, on the other hand, by increase of the cutaneous and pulmonary transpiration, by profuse diarrhœa, by hæmorrhage, or dropsy, in many forms of acute inflammation, and in the inflammatory stage of fever. It is suppressed, or greatly diminished, in inflammation of the kidney.

316. *Density of the Urine*.—1010 (Thomson); 1015 winter, and 1025 summer (Prout); 1015 for adults, and 1010 including children (Willis); 1012–1017 (Venables); 1016 (Macgregor); 1005 to 1030 (Müller); 1029 (Christison); 1005–1033 for adult and middle age (Dr. J. C. Gregory). According to the accurate observations of the last-named observer, the greatest range for the same individual is 21 degrees, the ordinary range from 1016 to 1031, and the average of 363 ex-

periments on 50 individuals, 1022.5. The average for 5 individuals whose urine was examined between 20 and 50 times each was 1025.2.

317. The density of the urine is greater in males than females ; it increases from childhood to manhood, and falls again in old age ; it is increased by hot weather, by much exercise, by free perspiration, by a very dry diet, by animal diet, by substances containing much azote, and by the meal of dinner. It is diminished by cold, by sedentary habits, by a watery diet, by vegetable food, by acids and alcoholic fluids. It is at its average in the morning on waking ; it falls considerably after breakfast ; it rises again gradually after mid-day ; it sinks again immediately after dinner, but in a few hours rises higher than at any other time ; and in the course of the night gradually returns again toward its average.*

318. The density of the urine in disease may vary from 1001 to 1055 ; and as the density in health does not appear to fall below 1005, nor rise above 1033, it follows that any number less than 1005 and above 1033 should be regarded as a sign of disease, and any number approaching either limit ought to attract attention. A less density than 1005 points to an increase in the quantity of the urine, with a diminution of some of its solid constituents. A greater density than 1033 strongly indicates diabetes mellitus, though 1030-1035 has been observed in cases of increased secretion with excess of urea.

319. The *solids* discharged have been known to amount in the day to 36 ounces avoirdupois, and to fall as low as 11 grains.

320. The *color* of the urine in health is inversely as its quantity ; when the urine is scanty, it is high colored ; when it is abundant, limpid. The urine first passed in the morning is usually of a higher color than that passed later in the day. The urine is pale in all diseases, accompanied with an increase of quantity ; while the natural color is deepened by a decrease in the quantity. It may be white or bluish white and turbid from the admixture of chyle, milk, mucus, or pus, or of the earthy phosphates in excess ; deep yellow or greenish yellow, from bile or the cystic oxyd ; dark red or purplish, from the admixture of the purpurates, as in inflammatory diseases ; yellow red, as in hectic and the sweating stage of intermittent fevers ; brownish or cherry red, from the admixture of the red particles of the blood ; black, from the admixture of melanic acid ; blue, from the cyanuric acid, &c. It is worthy of note, that many substances taken with the food may give a similar color to the urine with that produced by

* See Christison, Lib. Med., vol. iv., p. 216.

blood. Thus is the case with rhubarb, madder, beet-root, corn-poppy, cherries, mulberries, and logwood.

321. The natural *odor* of the urine is wanting where it is in large quantity and of a pale color, and increases as the urine diminishes and deepens in color: it is altered by various articles of food; it is aromatic in many nervous affections; ammoniacal in injuries of the spinal cord; putrid from the admixture of pus, mucus, ichor, &c., in diseases of the urinary organs, and in the last stages of putrid fevers; sweetish in diabetes mellitus. The *taste* is sweet in the last-named disease.

322. *Analysis of healthy Urine.*—According to Berzelius, 1000 parts of healthy urine contain 67 of solid matter, and are composed of 30 of urea, 17 of lactates and coloring matter, 18 of alkaline and earthy salts (chiefly chlorides, sulphates, and phosphates of soda, potash, and ammonia), 1 of phosphates of magnesia and lime, and 1 of lithic acid. Silica and fluorides of calcium?

323. The urine secreted after the digestion of food differs widely from that which is secreted after fluids have been taken. The former, the “urina chyli,” contains, according to Nysten, thirteen times as much urea, sixteen times as much lithic acid, and four times as large a quantity of salts as the latter, the “urina potus.” The first urine passed after a meal with which much water is taken would probably be found to be nearly allied to the “urina potus,” but to contain somewhat more animal matter.

324. In addition to the constituents of the urine mentioned above, other substances pass into it from the stomach. Some of them, as chyle and sugar, pass unchanged, others are decomposed. Many substances, as has been stated, may be detected in the urine very soon after their introduction into the stomach: thus, prussiate of potash has been detected in from two to ten minutes.

325. *Analysis of the Urine in Disease.**—The tests in most common use are turmeric and litmus paper, heat, and nitric acid. Muriatic and acetic acid, liquor ammoniæ, and the solution of the oxalate of ammonia, are also in frequent use. To these must be added a urinometer, for ascertaining the specific gravity of the urine, and the microscope.

326. *Turmeric paper* is changed from yellow to brown when the urine is alkaline. *Blue litmus paper* to red when the urine is acid. *Heat* throws down albumen, and the phosphates when in excess. *Nitric acid.*—A few drops throw down dead white precipitate of albumen: it throws down lithic acid.

* See *Analysis of Blood and Urine in Health and Disease*, by G. O. Rees, M.D., and Dr. Golding Bird on Urinary Deposits.

after the lapse of some hours ; it precipitates the coloring matter of bile of a green color, but, if added in excess, it changes it quickly to a dingy red, and afterward to a brown ; it also detects urea in excess, when added to urine in equal quantity, by the formation of crystals of nitrate of urea. Moreover, it produces a cloudiness in urine containing certain essential oils. *Muriatic acid* precipitates lithic acid, and the coloring matter of the bile. It throws down the latter of a green color, whatever quantity may be added. *Acetic acid* produces a cloudiness in urine containing mucus. *Caustic ammonia* throws down the earthy phosphates as a white precipitate, and the *oxalate of ammonia* is used to detect the presence of the phosphate of lime.

327. The urine submitted to examination in cases of disease should be either an average specimen of the entire day, or that voided on first rising in the morning. The urine which we have to examine may be either clear or loaded with deposits, or it may consist of a clear supernatant liquid and a sediment. In the latter case we must examine each portion separately. The substances held in solution in clear urine may be the natural constituents of the secretion in excess, or substances foreign to its healthy composition. Of the former, urea is the most important ; to the latter class belong sugar and albumen.

328. *Urea*.—This principle in excess gives a high specific gravity to the urine (1032 or more). It may be detected by adding to a small quantity of urine in a watch-glass an equal bulk of strong nitric acid. If this be kept in a cool place, crystals of nitrate of urea are formed. If the quantity of urea be small, we must evaporate before applying the nitric acid.

329. *Albumen*.—Tests, heat and nitric acid. These should always be employed at the same time ; for heat will throw down the phosphates if they are in excess, and the acid may render the urine turbid if it contain any essential oil, as that of cubeb or copaiba. Should the phosphates in excess co-exist with an essential oil, both heat and nitric acid would throw down a white precipitate. The addition of an acid will dissolve the phosphates ; the essential oil may be separated by ether, after which the urine will have its usual reaction.

330. *Sugar*.—The presence of sugar may be sometimes detected by the taste, especially if we first evaporate the urine to the consistence of a sirup ; but this test is not to be depended upon. There are also several other tests, which may be briefly mentioned. 1. The formation of oxalic acid by the addition of nitric acid and heat. 2. Evaporate the urine to the consistence of a thick sirup, and digest it in hot alcohol. Pour the cooled alcoholic solution into a large test-tube, or

into a cupping-glass, and allow it to evaporate spontaneously.

The sugar will crystallize on the sides of the glass in white granules. 3. *Moore's test*.—Pour a small quantity of the urine supposed to contain sugar into a test-tube, add to it about half its bulk of liquor potassæ, and boil for one or two minutes by the heat of a spirit lamp. The urine will assume an orange-brown tint of a depth proportioned to the quantity of sugar.

4. *The Copper tests*.—To the suspected urine in a large test-tube add enough solution of sulphate of copper to give the liquid a faint blue tint; add liquor potassæ in large excess; a precipitate of hydrated oxyd of copper is formed, which dissolves in the excess of alkali. On heating the liquid to ebullition, the red sub-oxyd of copper is thrown down if sugar be present: or, add to the urine a few grains of the blue hydrated oxyd of copper, and then a small quantity of liquor potassæ, so as to render the liquid alkaline. If sugar be present, the fluid becomes of a reddish color, and in a few hours the deposit of oxyd becomes yellow, first at the edges, and then through the whole mass; this arises from the reduction of the oxyd to the form of sub-oxyd. 5. But the most delicate test, according to Dr. Christison,* is the process of fermentation with yeast. On adding yeast to diabetic urine, and raising the temperature to 80°, effervescence takes place, a brisk discharge of gas ensues, and a yellowish liquid is formed, which has the odor of beer, and yields an alcoholic liquid by distillation. This test discovers one part of sugar in 1000 parts of healthy urine of the density 1030. "It is further an easy and the only correct mode of ascertaining the quantity of sugar. Every cubic inch of carbonic acid gas given off by fermentation corresponds in round numbers with one grain of sugar, or forty-seven of gas to forty-five of sugar. Hence the quantity of sugar may be easily found by filling a graduated tube with mercury, leaving space enough for a little more than the requisite quantity of urine, which is then to be introduced; next filling up what remains of the space with yeast, and, with the finger on the open end of the tube, reversing the tube in a vessel of mercury; and then placing the apparatus where it may be exposed to a heat of 70° or 80° for twelve or twenty-four hours."

331. The specific gravity of the urine is the test commonly employed at the bedside. This affords certain evidence of the existence of sugar only when it exceeds 1035, which is probably about the highest specific gravity of urine containing urea in excess. The specific gravity of diabetic urine ranges from 1020 to 1050. Hence, when the symptoms lead to a suspicion of the presence of sugar, a specific gravity above 1020,

* Lib. Pract. Med., vol. iv., p. 249.

though a little below the average in health, would lead us to apply some of the foregoing tests.

332. The quantity of solid matter contained in the urine may be calculated by multiplying the excess of the specific gravity of the urine above that of water by the weight of the urine, and the product by 0.00233. If the weight of given quantities of urine of different specific gravities be known, the amount of solids may be directly calculated from the measured quantity, and in this way we may determine the solid matter passed in twenty-four hours, provided the urine submitted to examination be an average of that passed during the entire period. To obviate the necessity for calculation, two tables are given, of which the first presents the weight of one pint of urine, and the second the quantity of solid matter contained in 1000 grains of urine of different densities. The mode of using the tables will be readily seen from a single example. Suppose a patient to pass, in twenty-four hours, 3 pints of urine of the specific gravity of 1.030, it is required to ascertain the weight of solid matter voided in this period. 1000 grains of urine, specific gravity 1.030, contain by Table I., 69.90 grains of solid matter, and a pint of urine of the same specific gravity weighs, by Table II., 9.012 grains. Hence $\frac{69.90 \times 9.012}{1000}$, or 629.9 grains, is the quantity of solid matter contained in each pint of urine; and 629.9×3 , or 1889.7 is the total weight of solids voided in the twenty-four hours. This calculation will give a near approximation to the actual weight of saccharine matter in cases of diabetes mellitus.

TABLE I.

Solids in 1000 Grains of Urine of different Densities.

Sp. Gr.	Solids.	Sp. Gr.	Solids.	Sp. Gr.	Solids.
1001	2.33	1018	41.94	1035	81.55
1002	4.66	1019	44.27	1036	83.88
1003	6.99	1020	46.60	1037	86.21
1004	9.32	1021	48.93	1038	88.54
1005	11.65	1022	51.26	1039	90.87
1006	13.98	1023	53.59	1040	93.20
1007	16.31	1024	55.92	1041	95.53
1008	18.64	1025	58.25	1042	97.86
1009	20.97	1026	60.58	1043	100.19
1010	23.30	1027	62.91	1044	102.52
1011	25.63	1028	65.24	1045	104.85
1012	27.96	1029	67.57	1046	107.18
1013	30.29	1030	69.90	1047	109.51
1014	32.62	1031	72.23	1048	111.84
1015	34.95	1032	74.56	1049	114.17
1016	37.28	1033	76.89	1050	116.50
1017	39.61	1034	79.22		

TABLE II.

Weight of a Pint of Urine of different Densities

Sp. Gr.	Weight of one pint.	Sp. Gr.	Weight of one pint.	Sp. Gr.	Weight of one pint.
1.010	8837	1.024	8960	1.038	9082
1.011	8846	1.025	8968	1.039	9091
1.012	8855	1.026	8977	1.040	9099
1.013	8863	1.027	8986	1.041	9708
1.014	8872	1.028	8995	1.042	9117
1.015	8881	1.029	9003	1.043	9126
1.016	8890	1.030	9012	1.044	9134
1.017	8898	1.031	9021	1.045	9143
1.018	8907	1.032	9030	1.046	9152
1.019	8916	1.033	9038	1.047	9160
1.020	8925	1.034	9047	1.048	9169
1.021	8933	1.035	9056	1.049	9178
1.022	8942	1.036	9064	1.050	9187
1.023	8951	1.037	9073		

33. *Urinary Deposits.*—These consist either (*a*) of substances which, being naturally contained in the urine, are in too large quantity to be held in solution by it, or which, being in their normal quantity, are decomposed by some other principle in excess; or (*b*) of animal products not naturally contained in that fluid. To the former class belong uric acid, urate of ammonia, the earthy phosphates, &c.; to the latter, the red particles of the blood, pus, mucus, &c.

334. (*a*) The first class of deposits consists of the following:

1. Red crystalline sediment: uric acid, with coloring matter of the urine.

2. White crystalline sediment: triple or ammoniaco-magnesian phosphate.

3. White amorphous sediment: triple phosphate and phosphate of lime.

4. Pink sediments: urate and phosphate of ammonia.

5. Yellowish or nut-brown sediment: urate of ammonia and soda, earthy phosphates, and coloring matter of urine.

6. Reddish brown or lateritious sediment: alkaline urate (chiefly urate of soda), earthy phosphates (occasionally), coloring matter of urine, and alkaline purpurate.

7. Oxalate of lime

8. Carbonate of lime } very rare.

9. Cystic oxyd.

335. *Tests.*—Uric acid. Insoluble in water, soluble in caustic potash, and precipitated granular and colorless from this menstruum by the addition of an acid, dissolved by nitric acid with effervescence, and, on evaporation to dryness, yields a red or pink color, changed to violet by the addition of ammonia. Microscopic form, rhomboidal plate or prism, with or without nucleus, and of a yellow color.

336. The substances contained in 2, 3, 4, 5, and 6 consist of a mixture of coloring matter with the alkaline urates and the earthy phosphates in variable proportions. These are easily distinguished, both from each other and from certain secretions which may resemble them. This is done by shaking the sediment up in the urine, and applying heat to the turbid fluid. If the sediment dissolves, it consists of the alkaline urates, and chiefly of urate of ammonia; if, on the other hand, the fluid remains turbid, the deposit consists of the earthy phosphates, or of organic matter in the form of pus or mucus. These may be readily distinguished by the addition of muriatic acid, which dissolves the phosphates, but not the organic matters.* If urine containing urates also holds albumen in solution, the urine first becomes clear, and then turbid on the application of heat.

337. The *phosphates* possess the following properties. They are soluble in acids, but insoluble in liquor potassæ. The phosphate of *ammonia* yields ammonia, when treated with liquor potassæ; and the phosphate of *lime* is detected by the addition of oxalate of ammonia to the solution of the phosphate in acetic acid. If, after the addition of oxalate of ammonia, a precipitate be caused by ammonia, the ammoniaco-magnesian phosphate is present. As the phosphate of ammonia commonly exists in union with magnesia, forming the ammoniaco-magnesian phosphate, the disengagement of ammonia on the addition of liquor potassæ is presumptive evidence of the existence of the ammoniaco-magnesian phosphate. If the oxalate of ammonia and the liquor ammoniæ both occasion a precipitate, phosphate of lime and ammoniaco-magnesian phosphate are both present. The mixture of these two is peculiarly fusible before the blow-pipe. Form of crystals of the neutral triple phosphate of magnesia and ammonia, rectangular prisms.

338. The *urates* present the same chemical properties with the uncombined uric acid; the *urate of ammonia*, when dissolved in liquor potassæ, gives off ammonia. *Soda* in combination with uric acid may be detected by the yellow color given to the outer flame of the blow-pipe.

339. *Oxalate of Lime*.—This, which is a common constituent of urinary calculi, sometimes exists in the urine as a deposit, but more frequently diffused through it in the form of minute octahedral crystals, which may be rendered visible under the microscope. It may be known by its insolubility in water, liquor potassæ, acetic acid, and warm nitric acid. It is soluble in cold nitric acid, and converted at a red heat into *carbonate of lime*, which is known by dissolving with efferves-

* Rees, Analysis of Blood and Urine, p. 145.

cence in muriatic acid. Form of crystals, flattened octahedrons.

340. The *cystic oxyd* sometimes exists in the urine in the form of a fine impalpable powder, forming a scum on the surface, a deposit, or a floating cloudiness. Its presence may be suspected where the urine is greenish yellow, muddy, and of a mixed odor of fetid urine and the sweet-brier. It possesses the following characters: it is soluble in dilute muriatic acid, insoluble in tartaric, acetic, or citric acid, soluble in liquor potassæ, precipitated from this solution by solution of bicarbonate of ammonia, and it possesses a very peculiar odor when heated.* Form of crystals, equilateral hexahedral laminæ.

341. (b) *Animal Products not naturally contained in the Urine, and appearing, for the most Part, in the Form of Deposits. Red Particles.*—This sediment is at once distinguishable by its peculiar color. It may be identified by becoming of a bright red color when treated with a concentrated solution of muriate of soda. The urine is also coagulable by heat, and floating blood-corpuscles are seen under the microscope. *Pus and Mucus.*—When these exist in small quantity, they are not easily distinguished. *Pus* commonly forms a distinct, creamy deposit, of a yellowish or greenish yellow color, but sometimes it is white, and may be confounded with other deposits. It is easily diffused through, but not soluble in, urine; it resists the action of acids, and it becomes a flocculent mass when heated. *Mucus*, when in small quantity, remains in solution in the urine; when in excess, the urine is ropy, unaffected by boiling, and rendered cloudy by a few drops of acetic acid. At other times the mucus is found adhering to the vessel in the form of a ropy, glairy mass. When in very large quantity, the urine is always alkaline and ammoniacal, a condition which generally indicates organic disease in the kidneys or bladder. *Bile.*—Properties, insoluble in water, readily dissolved by liquor potassæ, yielding a fine green color with dilute nitric and muriatic acids, and a red color with strong nitric acid. *Chyle, milk, semen, fatty matter, and phosphorus* have been found in the urine; as also blue and black deposits, consisting of peculiar animal principles. All these are rare. Various substances have also been mixed with the urine, with a view to impose on the medical man.

EXAMINATION OF THE ABDOMEN AND ORGANS OF DIGESTION.

342. *The Abdomen.*—To facilitate description, the abdomen has been divided into a number of distinct parts or regions by imaginary lines drawn from fixed points.—(See Figures.)

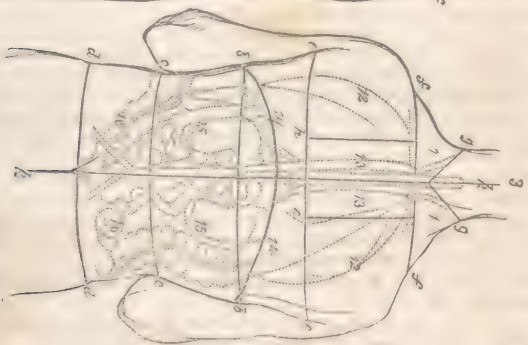
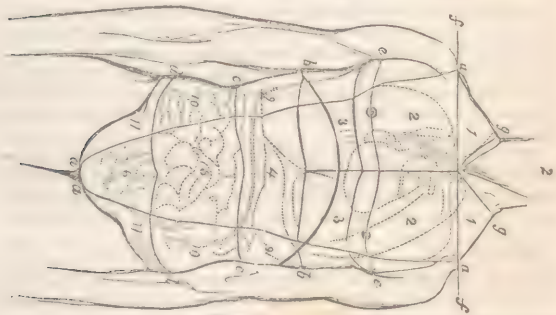
* Christison.

It is divided into an anterior and posterior region by a vertical line drawn from the posterior margin of the axilla to the crest of the ilium on each side (*i i*, fig. 1). The anterior region is subdivided into nine smaller ones by two oblique lines (*a a*) extending from the acromial extremity of the clavicle to the spine of the pubes, and three horizontal lines extending round the abdomen, the first at the level of the ensiform cartilage (*b b*), the second on the last short rib (*c c*), and the third on the anterior superior spinous process of the ilium on each side (*d d*). The three central regions thus formed are named in the order from above to below, the epigastric (4), the umbilical (5), and the hypogastric (6); the three lateral regions, taken in the same order, are the right and left hypochondriac (9), the right and left iliac (10), and the right and left inguinal (11). The posterior region is divided into four smaller regions by a vertical line (*k*, fig. 3), following the course of the spine, and by a continuation of the three transverse lines (*b, c, d*) just described. These four regions are the inferior dorsal, right and left (15), and the lumbar, right and left (16).

343. The organs situated in each of these regions are as follow: The *epigastric* contains the middle portion of the stomach with its pyloric extremity, the left lobe of the liver, the lobulus spigelli and hepatic vessels, the pancreas, cœliac axis, the semilunar ganglion and part of the vena cava, aorta, vena azygos, and thoracic duct. The *umbilical* contains the omentum and mesentery, the transverse portions of the duodenum and colon, and some convolutions of the jejunum. The *hypogastric* is occupied by the bladder and a portion of the omentum and small intestines. Behind the bladder lies the uterus in the female, and the rectum in the male. The *right hypochondriac* region contains the right lobe of the liver and the gall-bladder, part of the duodenum and ascending colon, the renal capsules, and part of the kidney: the left contains the large end of the stomach, the narrow extremity of the pancreas, the spleen, part of the colon, the renal capsules, and upper part of the kidney. The *right iliac* region contains the cæcum, with the termination of the ilium and the commencement of the colon; the left, the sigmoid flexure and part of the descending colon. A small portion of the cæcum and of the sigmoid flexure of the colon are contained in the right and left inguinal regions respectively.

344. Of the posterior regions, the *right inferior dorsal* contains a part of the colon and lower two thirds of the right kidney; the *left*, the spleen and lower two thirds of the left kidney. The *right lumbar* contains the cæcum; the *left*, the sigmoid flexure of the colon.

345. When any of the organs are distended or enlarged,



they encroach upon surrounding parts, and occupy adjoining regions. Thus, the distended stomach or bladder may encroach on the umbilical region; the distended colon may rise into the epigastrie; and the enlarged liver or spleen may descend into the right or left iliac region.

346. The *size and shape* of the abdomen vary with age and sex. In the child, the abdomen is large; in the spare adult, small; in the female it is naturally pendant, presenting an enlargement in the hypogastric region. In persons of sanguine and nervous temperaments it is small; in the phlegmatic, and in the melancholic, it is more commonly large. It varies in size, in the same person, with the full or empty state of the stomach, the quantity of gas contained in the intestines, the distention of the bladder, &c. It is enlarged in pregnancy. Ascites, ovarian dropsy, tympanitis, hydatids, enlargement of the liver or spleen, and various morbid growths attached to the several organs, may also greatly increase the size and alter the shape of the abdomen. In examining the abdomen we employ three methods: inspection, manual examination, and percussion.

347. By *inspection* we ascertain the size, form, and movements of the abdomen. The size is increased by any of the causes just specified; the form, too, is altered, either throughout the entire cavity, or in parts, according as the cause is extensive or limited. The history of changes of form is very important. Thus, the gradual, uniform, and central enlargement of pregnancy, the lateral enlargement in the first stage of ovarian dropsy, and the equal and gradual growth of ascites, **form important means of diagnosis.**

348. The movements of the abdominal parietes are not less important, especially those of respiration. Thus, in peritoneal inflammation respiration is performed by the chest alone; and the same absence of motion in the abdomen is seen in severe rheumatic affections of its muscles. On the other hand, in pleuritis and in severe rheumatic affections of the muscles of the chest or of the diaphragm, the respiration is performed chiefly by the muscles of the abdomen. Again, when the abdomen is greatly distended from any cause, the action of the abdominal muscles is nearly suspended, and respiration is performed by the chest and diaphragm. When the distention is still greater, the viscera are pressed against the diaphragm, and respiration is performed solely by the muscles of the chest.

349. By the *touch*, we gain further information as to the size, form, shape, and degree of tension of the abdomen. We also ascertain its temperature and degree of sensibility. The *temperature* should be compared with that of other parts of the

body. In acute inflammation of the peritoneum, and in severe febrile affections, accompanied with abdominal inflammation, it is greatly increased, and has a peculiar pungency.

350. In ascertaining the degree of *sensibility*, pressure should first be made gently, and with the open hand. If the slightest touch produces pain, and that pain is accompanied by inflammatory fever, the disease is in the peritoneum; but if fever is absent, the pain is neuralgic, and will often be found associated with a tender state of the spine. If a slight touch produces no pain, we apply stronger pressure. If deep and moderately strong pressure occasions rather a feeling of soreness than of acute pain, we may conclude that inflammation of the mucous membrane of the stomach or intestines is present. Direct pressure of this kind sometimes produces very slight pain, even when the peritoneum is inflamed; in such cases, a lateral pressure, causing the peritoneum to slide over the intestines, occasions extreme pain. In colica pictonum, strong pressure relieves pain, and forms an important means of diagnosis. Muscular pain, also, is relieved by gentle pressure, gradually increased; but, on the removal of the pressure, the muscles are thrown into action, and acute suffering is produced. But even during the application of the hand, pain may occur, from the sudden contraction of the muscles in the act of expiration. Hence the necessity of applying this diagnostic mark with some caution. Muscular pain, too, is rarely accompanied by much constitutional disturbance, and, like neuralgia of the skin, is often dependent on an irritable state of the spinal marrow.

351. In applying pressure to the abdomen, we should always mark the expression of the countenance, as this is much more to be depended on than the answers of the patient, especially in cases accompanied by typhoid symptoms, or when the brain is much affected. When much tenderness exists in the abdomen, the patient is apt to throw the muscles into rigid tension, so as to shield the contents of the cavity from pressure. In this case, we must wait till the contraction passes off, and seize the opportunity of applying pressure when the attention has been diverted, or while the patient is speaking.

352. If in the examination of the abdomen any tumor has been discovered, or we are anxious to ascertain the state of any of its contents more accurately, it will be necessary to relax the muscles of the abdomen, by placing the patient on his back, with the head slightly raised and bent forward, the arms extended by the sides, the thighs bent nearly at right angles on the trunk, the knees apart and turned outward, and the feet resting on the bed in contact with each other. When so placed, the patient must be desired to use as little muscu-

lar effort as possible, and the attention must be diverted from the examination which is going on. In this relaxed state of the abdominal parietes, the position of tumors, and the extent of the enlargement which the viscera may have undergone, are readily ascertained.

353. Another mode of examination is by *percussion*. This may be performed, either directly with the points of the fingers, or by the intervention of a plate of ivory or wood, or of a finger of the left hand. Applied in this latter manner over any of the hollow viscera containing air, percussion elicits a clear sound. This sound is somewhat modified, if the air be mixed with fluid. Percussion, on the other hand, elicits a dull sound when applied over any of the solid viscera, over collections of fluid, over the hollow viscera when entirely free from air, or over solid tumors formed within the cavity.

354. Percussion combined with touch may be employed in detecting the presence of fluid. This is best done in the upright posture. It consists simply in placing the palm of the hand on one side of the abdomen with a firm but gentle pressure, and tapping sharply with the other hand on the part of the abdomen directly opposite to it. If fluid be present a peculiar vibrating shock is experienced, which is not easily mistaken.

355. Percussion with the points of the fingers is useful in distinguishing muscular pains of the abdomen. A slight touch throws the muscles into action, and produces pain. This sign, combined with the absence of pain on firm pressure gradually applied, and the recurrence of the pain on the sudden removal of the pressure, together with the effect of every movement of the affected muscles, distinguishes muscular pains from those arising from disease of deeper-seated parts.

356. *Organs of Digestion*.—The condition of the alimentary canal is revealed in part by the state of the tongue; in part by alterations in the functions of the stomach and intestines, as vomiting, purging, &c.; and in part by the character of the substances rejected.

357. The *tongue* does not present the same appearance in all healthy persons. In some it is habitually clean; in others, slightly furred; in some, florid; in others, pale; in some, compact and firm; in others, flaccid, and indented by the teeth; in some it is protruded in a relaxed state; in others, strongly contracted and drawn to a point. Even in the most healthy persons it is covered with a thin white fur in the morning before taking food.

358. In disease the tongue presents a great variety of appearances. It is swollen in inflammation of the tongue itself, in severe diseases of the adjacent parts, in salivation from mercury, and in malignant disease—on the other hand, its

size is diminished where much emaciation is present. Its *form* varies with the mode in which it is protruded. Its *color* coincides, to a certain extent, with that of the general surface. Thus, it is florid in plethora, pale in anæmia, and livid in certain diseases of the heart and lungs, which greatly affect the respiration. The color of the tongue also depends upon the state of the digestive organs. Thus, it is universally red, or red at the tip or edges, or both, in some cases of acute inflammation of the mucous membrane of the stomach and intestines. It is also morbidly red and tender in some forms of fever, in well-marked cases of scarlatina, and in typhus fever after the disappearance of the fur.

359. The *papillæ* of the tongue are elongated and florid, and protrude through the white coating of fur in scarlatina; and a similar appearance exists in some cases of acute dyspepsia.

360. A *fur* collects on the tongue in almost all severe diseases. Thus, the tongue is loaded with a white fur in the first stages of fever, in catarrh, in quinsy, in most severe inflammations, and in acute rheumatism. In more advanced stages of fever a thick brown or black coating collects, or the tongue is dry, parched, and tender. A brown, dry fur exists in cases of local irritation, the tongue becoming moist and clean as the irritation subsides. In dyspepsia, the appearances of the tongue are very variable. Sometimes a thick fur collects at the base of the tongue, while the edges and apex are of a bright red; sometimes the fur extends over the whole surface, and is accompanied by indentations formed by the teeth, or by deep transverse cracks. In constipation, the tongue is often covered with a brown fur; at other times it presents no unusual appearance.

361. The mode in which the tongue is *protruded* is often characteristic. It is tremulous in extreme debility, or under the influence of fear, as also in cases of idiopathic fever with debility. It is protruded with difficulty when dry; slowly and hesitatingly, in diseases accompanied by stupor, in which cases it is withdrawn after an interval, and as if in consequence of deliberation. In partial paralysis the tongue is protruded either toward the sound or the affected side of the face.

362. The *gums*, from their proximity to the tongue, may be mentioned here, though they are signs rather of the state of the circulation than of the digestive organs. The gums are florid in plethoric states of the system; pale in anæmia; livid in cases where the function of respiration is much impeded; swollen and dark in scurvy and purpura hæmorrhagica, in which diseases they bleed on the slightest touch; swollen with an inflamed line in cases of salivation; marked with a blue line at the margin of the teeth in poisoning by lead.

363. The *lips* and lining membrane of the mouth, like the gums, inform us as to the state of the circulation. They are also dry and parched where the tongue is similarly affected. Aphthæ occur on all these parts as an idiopathic affection, especially in young children, and toward the close of febrile and inflammatory affections. An herpetic eruption on the lips is a common accompaniment of severe catarrh, and is often useful as a diagnostic mark.

364. The existence or absence of thirst, and the odor of the breath, are points to be attended to in inquiring into the state of the digestive organs. The foul odor of the breath in some cases of constipation, in many forms of dyspepsia, in cases of scurvy, in advanced stages of typhus fever, and especially in gangrene of the lungs, should not pass unnoticed. The odor of spirits, laudanum, &c., may also assist us in certain doubtful cases.

365. The functions of the stomach and intestinal canal suffer more or less in almost all diseases, whether affecting the canal itself, or other parts of the system. In all febrile affections, in the more severe inflammatory diseases, in affections of the head, and in sudden and violent shocks to the system, the stomach sympathizes. Loss of appetite is the most common consequence of disease, whether of the stomach or of other important organs.

366. *Vomiting* occurs in inflammation of the mucous membrane of the stomach, by whatever cause produced; in obstruction to the passage of the food through the pylorus, as in cancer of the stomach; in permanent obstruction to the passage of the fæces through the intestines, as in ileus and strangulated hernia. It is the first effect of concussion of the brain, and a frequent precursory symptom of apoplexy. It accompanies the passage of gall-stones, and is commonly present in severe inflammation of the kidneys. It is also one of the most constant symptoms of pregnancy. The substances rejected from the stomach are, food, mucus, clear acid liquids, bile, blood, pus, and, in some cases, fæces. The blood is usually dark-colored and in clots, sometimes with and sometimes without food.

367. The *bowels* are variously disordered; sometimes confined, from torpor, from the absence of their natural stimulus, or from mechanical obstruction; sometimes relaxed, from inflammation of the mucous membrane, whether caused by previous constipation, unwholesome food, purgative medicines, or irritant poisons: strong mental emotions, also, sometimes give rise to diarrhœa.

368. The alvine discharges may consist of mucus, tenacious lymph, or pus, as in inflammations of the mucous mem-

brane of the canal, the nature of the secretion depending on the degree of the inflammation ; or they may consist of blood poured out by the vessels of the intestines generally, or by the enlarged veins of the rectum (piles). They may consist chiefly of ill-digested food, which happens in *tabes mesenterica*. They may be pale from the absence of bile, unusually yellow from its excess, green, as often happens in children, dark and offensive, from the long retention of feculent matter, or from morbid secretions of the liver. They often contain portions of hardened feces or *scybalæ*. It is important in all doubtful cases to distinguish those discharges which flow from the general surface of the intestines, from such as are the product of local disease in the rectum. When, therefore, pus or blood is discharged with the motions, the presence or absence of tenesmus, piles, or fistula should be ascertained.

EXAMINATION OF THE CHEST.

369. *External Examination.*—An examination of the external conformation of the chest must precede all inquiries into the diseases of parts contained within it. To facilitate such examination, the chest, like the abdomen, has been divided into regions, by lines drawn from fixed points. (See Figures, p. 99.) There are four vertical lines : 1, along the middle of the sternum, from its upper to its lower extremity ; 2, along the whole length of the spine ; 3, from the posterior margin of the axilla to the spine of the ilium on each side (*i*) ; 4, along the spine of the scapula, on each side, meeting the transverse lines, presently to be mentioned, above and below (*h*) : an oblique line (*a a*) from the acromion to the spine of the pubes on both sides ; and four transverse lines : 1, round the lower part of the neck, sloping downward to the upper end of the sternum anteriorly, and the last cervical vertebra posteriorly (*g*) ; 2, round the upper part of the chest, in the line of the clavicles (*f*) ; 3, round the middle of the chest, crossing the nipples anteriorly, and the inferior borders of the scapulæ behind (*e*) ; 4, round the lower part of the chest, on the level of the ensiform cartilage (*b*). By these imaginary lines, the chest is divided into the following regions : Two superior (right and left humeral, 1) ; four right anterior (right and left subclavian, 2, and right and left mammary, 3) ; four lateral (right and left axillary, 7, and right and left sub-axillary, 8) ; and six posterior regions (right and left scapular, 12, right and left intrascapular, 13, and right and left subscapular, or superior dorsal, 14).

370. The principal parts contained within the cavity of the chest are the lungs and heart, of which the former occupy by far the largest portion. Of the two lungs, the right is larger

than the left, but the left longer than the right, its apex rising somewhat higher, and its base sinking lower. The base of both lungs rests on the diaphragm, and the two are separated from each other by the mediastina, of which the middle contains the heart. The lungs, applying themselves closely to the diaphragm, descend much lower behind than before, being there prolonged into thin lappets. The size of the chest corresponds closely with the size of the lungs, and is liable to various deformities, in consequence of diseases affecting those organs. The shape of the chest is also altered in certain diseases of the heart and large vessels.

371. The size and shape of the chest, and the number and character of the respirations, may be determined by *inspection*, *manual examination*, and *measurement*.

372. *Inspection*.—A well-formed chest is large in all its dimensions, uniformly rounded, and free from all irregularity in the bony parietes. The spine should be straight, or, in very strong men, especially those who use the right arm much, curved almost imperceptibly toward the right side. It appears at first sight symmetrical; but when measured, the right side will be found larger than the left by about half an inch, and there is naturally somewhat more fullness above and immediately beneath the left than the right clavicle, which results from the left lung rising higher than the right. The chest is larger in males than in females; in the latter it is commonly distorted by the use of stays. Women are also more subject than men to distortions of the spine. These facts must be borne in mind in examining the chests of females.

373. The first glance at the chest enables us to form a judgment of its size. A more minute examination is necessary to detect deviations from its accustomed form. The chief distortions, affecting both sides of the chest alike, are those arising from the use of stays in the female, and constrained posture in the male. Of the latter, the most remarkable is the flattened chest of the shoemaker. Alterations in the shape of both sides of the chest also arise from diseases affecting equally both lungs; as tubercles, leading to contraction, especially in the subclavian region, and dilatation of the pulmonary cells (emphysema), causing a considerable enlargement chiefly about the middle of the chest. Alterations in the shape of one side only, or of a limited portion of one side, may arise from more than one disease of the corresponding lung. Pleuritis, both acute and chronic, causes an enlargement of the affected side, but in certain cases the same disease produces contraction. In hydrothorax, also, the size of the affected side is increased. The same result follows pneumothorax. When the dilatation is extreme, the intercostal spaces are

often raised to a level with the ribs. More partial changes arise from circumscribed pleurisy and limited adhesions. In advanced cases of phthisis, the position of a cavity is often indicated by the falling in of one of the intercostal spaces. Inspection also enables us to ascertain the character of the respiration: whether abdominal, as in acute pleurisy, or acute pleurodynia, or thoracic, as in acute diseases of the abdomen, and severe rheumatic affections of the abdominal muscles or of the diaphragm.

374. *Manual Examination.*—By this, as by inspection, we ascertain the development of the muscles, the thickness of the parietes of the chest, the presence of obesity or emaciation, of œdema, emphysema, &c. Heat and soreness of the skin, the existence of local tenderness, from whatever cause, or of muscular pain, may be ascertained by the same means. The skin of the chest is preternaturally hot in pneumonia, and in all inflammatory affections of the lungs. Firm pressure in the intercostal spaces often causes pain when the pleura is inflamed, either generally or partially; this partial tenderness occurs in phthisis pulmonalis, when the pleura covering a cavity is inflamed, or when a collection of pus is making its way externally.

375. Muscular pains exist in pleurodynia, whether idiopathic, or the consequence of violent efforts in coughing. Such pains are distinguished by slight percussion with the points of the fingers, by the movements of the arms or trunk, by the sudden and sharp pain produced by a deep inspiration, and by the absence of pain on firm and gradual pressure, with its recurrence when the support is suddenly removed. Percussion with the fingers throws the muscles visibly into action through the whole length of their fibres, and, in certain cases, causes remarkable partial and transverse contractions. These are best seen in advanced cases of consumption, when they are sometimes accompanied by severe pain. These partial contractions are not confined to the muscles of the chest, but may be excited in the biceps and in every other muscle of the body. In cases of pulmonary consumption these contractions are often most readily produced on the side most affected.

376. *Measurement.*—This is effected by means of a graduated tape, stretched from one point of the chest to another. It is principally employed to ascertain the relative size of the two sides of the chest. For this purpose, one end should be applied to the spine, and the tape carried horizontally round the two sides of the chest; and to insure accuracy, the tape should be made to pass over the two nipples, or at the same distance above or below them. The chest should first be measured after a full expiration, and then after a deep inspira-

tion; by watching the movement of the tape, we may measure the degree of expansion which both sides of the chest undergo. This will give us useful information as to the condition of the lungs. In making these measurements, the fact already stated, viz., that the right side of the chest is naturally larger than the left by half an inch, must be borne in mind. The progressive enlargement or diminution in the size of the chest which accompanies certain forms of disease, may also be ascertained by repeated measurements; but such measurements require to be made with great care, in the same position, and in the same condition of the cavity of the chest.

377. Attempts have been made to ascertain the capacity of the lungs. For this purpose two plans have been proposed: one by Mr. Abernethy, the other by Dr. Lyons. Mr. Abernethy's method consists in making the patient take as deep an inspiration as possible, and then causing him to expire through a bent tube, communicating with an inverted jar containing water. The quantity of water displaced is a measure of the capacity of the lungs. A person in good health, with sound lungs, can displace six or eight pints. If the quantity displaced is much less than this, we may infer that the lungs are diseased, or compressed from without. "Muscular debility or spasm," says Mr. Abernethy, "may occasionally make the result doubtful, yet in general I believe it will afford useful information." A very ingenious and accurate instrument for measuring the capacity of the chest and the power of its muscles has been recently invented by Mr. Hutchinson.

378. Dr. Lyons's method consists in measuring the length of time required to empty the chest after a complete inspiration. To render the expiration continuous and complete, the patient is required to count from one upward, as far as he can, slowly and audibly; and the number of seconds during which he is able to count is noted by a watch. The time occupied is a sort of measure of the capacity of the lungs. Dr. Lyons fixes the limit of time for perfectly healthy persons at thirty-five seconds: this is too low; for in more than one trial I have myself continued to count for forty seconds. In confirmed phthisis, Dr. Lyons says that the period of expiration never exceeds eight, and is frequently less than six seconds; while in pleurisy and pneumonia it may range from four to nine. This test is subject to greater fallacy than Mr. Abernethy's, but may admit of useful application.*

379. *Examination of the Chest by Percussion and Auscultation.—The Lungs.*—The ear is employed in two ways in examining the chest: in listening to the sound occasioned by

* See, on this subject, *Cycl. of Pract. Med.*, vol. i., p. 376. Art. *Exploration of the Chest*, Dr. Forbes.

percussion of the parietes of the cavity, and in listening to the sounds produced in the chest itself by the motion of its contents. Both these modes of examination are included in the meaning of the term auscultation ; but it is usual to designate the first *percussion*, and the second *auscultation*.

380. *Percussion*.—If the chest, instead of containing a variety of solid parts, were filled with air, it would yield, when struck, a sound like that of an empty barrel or drum ; if, on the contrary, it were filled with solid animal substance, it would sound as dull as the arm or thigh. But containing, as it does, a spongy organ, the lung including in its tissue a large quantity of air, it yields, when struck, a hollow sound, but one less hollow than that which it would give if empty. The more air it contains, the more hollow it sounds ; hence the sound is clearer during inspiration than during expiration. If, again, the texture of the lung be so altered as to admit a larger quantity of air, the chest yields a clearer sound : this takes place in emphysema. On the other hand, if the lung from any cause admit less air than usual, the sound becomes more dull : this happens in congestion of the lungs, in inflammation, in tubercular deposition ; as also when fluids, collecting in the sac of the pleura, compress the structure of the lung, as in hydrothorax and empyema. But if, instead of fluid, air should exist in the cavity of the pleura, the sound, instead of being more dull, would be more hollow than if the healthy lung were in contact with the chest.

381. The chest, then, yields a hollow sound when it contains air, a dull sound when air is excluded, the degree of hollowness or dullness depending upon the quantity of air. But there is another cause which influences the nature of the sound, viz., the thickness of the parietes of the chest itself. If two chests contain exactly the same quantity of air, that will give the clearest sound which has the thinnest parietes. If the walls of the chest are padded with muscle or fat, the sound becomes more dull. In the healthy chest, then, the clearness of the sound will vary directly as the quantity of lung beneath the part struck, and inversely as the thickness of the parietes in that part.

382. The lungs are in close contact with the walls of the chest on both sides in the upper and middle part. On the right side they extend to about the level of the sixth rib in front, of the eighth rib at the side, and still lower behind. At the center of the chest the lungs reach the fifth rib ; on the anterior portion of the left side, they extend to the seventh rib ; laterally, they reach the eighth ; posteriorly, they descend still lower. The diaphragm separates them from the liver on the right side, from the stomach in the region of the epigas-

trium, and from the spleen and colon on the left side posteriorly. The mass of the liver in the right hypochondrium explains the dull sound caused by percussion below the level of the sixth rib; the stomach, which usually contains flatus, accounts for the clearer sound heard on the left side.

383. The lungs are in close contact with the walls of the chest in every part, with the exception of the small portion to the left of the sternum, occupied by the heart: in this position the chest yields a dull sound, and all enlargements of the heart extend the limits of this dullness. Whenever the substance of the lung is thin, the sound, on percussion, is modified by the viscus lying immediately behind it: thus, below the fourth rib, the layer of lung lying in front of the liver is thin, and the sound is consequently intermediate between that of the chest above and below it, more dull than the upper part, less so than the lower. In this position, and in all cases where a thin layer of healthy lung lies in front of a solid organ or consolidated portion of lung, gentle percussion elicits the clear sound of the healthy lung, strong percussion that of the solid substance behind it. The parts of the chest which yield the clearest sound are those which are least covered with muscle, viz., the space immediately beneath the clavicle, the axilla, and the posterior parts of the chest, with the exception of the scapulae.

384. In examining the chest, the patient should be placed in the erect, or sitting posture, and, if possible, in an open room. All curtains, bed-clothes, &c., dull the sound. The chest should be bare when practicable, but in females it may be covered by a single layer of clothing. Each part of the chest submitted to examination should be rendered as tense as possible; the anterior part of the chest, by stretching the neck and throwing back the shoulders; the axilla, by raising the arms above the head; and the posterior part of the chest by causing the patient to fold his arms and stoop down. Opposite and corresponding points of the chest should be accurately compared. For this purpose, the position of both sides must be the same. If we are examining the anterior part of the chest, the hands must fall loosely at the sides; if the lateral regions, they must be raised equally above the head; if the posterior, they must be equally folded.

385. There are different ways of eliciting the sounds of the chest by percussion. We may strike with the points of the fingers, or with the flat of the hand; or we may interpose the fingers of the opposite hand, or a thick piece of India rubber, or a plate of wood or ivory. Such things are called pleximeters, and percussion, by means of them, is named "mediate percussion."

386. Direct percussion with the points of the fingers ought

never to be employed, except for the purpose of throwing the muscles of the chest into action, with a view of ascertaining either the irritability of the muscles or the seat of pain. In many cases, especially in phthisis pulmonalis, the skin and muscles are acutely sensitive, and the slightest touch occasions pain. This is a sufficient objection to direct percussion with the fingers. Percussion with the open hand is little used except as a means of contrasting the two sides of the chest over their whole extent at once.

387. Mediate percussion ought always to be preferred, and the best pleximeter is formed by one or two fingers of the left hand applied closely to the surface. The finger should always be applied with a tolerably firm pressure, especially in stout, flabby, dropsical, or emphysematous subjects. By such pressure the skin and flesh are condensed, and made better conductors of sound. The finger thus applied should be sharply struck by the three middle fingers of the right hand, taking care to strike perpendicularly to the surface, and not obliquely. In comparing the two sides of the chest, care should be taken to strike the same point with the same force, and in the same condition of the chest, whether filled with air in inspiration, or partly emptied by expiration. The comparison can be most accurately made when the breath is held. When it is desired to ascertain the condition of a small spot, one finger only of the right hand should be used.

388. The chief indications given by percussion in disease have been already hinted at. When practiced on a part of the chest where a mass of lung is situated, it will yield either a clear or a dull sound. The indications afforded by such sounds are shown in the following table :

In the Lungs.		External to the Lungs.
Clear Sound on Percussion.	Healthy condition.	Pneumothorax.
	Emphysema.	
	Tubercular excavation.	
Dull Sound on Percussion.	Congestion and hepatization.	Pleuritic effusion.
	Pulmonary apoplexy.	Hydrothorax.
	Edema.	Hæmatorax.
	Tubercular deposit.	Tumors in pleura or mediastinum.
	Other morbid degenerations.	Displacement of heart or arteries, with enlargement.

389. The position in which the clear or dull sound occurs will enable us to judge of the cause by which it is produced. Thus, emphysema, though it may be confined to one side, and to a small portion of lung, commonly occurs on both sides of the chest at once, and over a large portion of the lungs; pneumothorax, on the contrary, is usually confined to one side, and

tubercular excavations occupy, for the most part, the upper lobes of the lungs.

390. A dull sound may arise from a greater variety of causes, which, however, admit of the same distinction. Thus, congestion, and the various degrees of hepatization, the consequence of pneumonia, occupy chiefly the lower lobes, on one or both sides; œdema commonly exists in both lungs at the same time; tubercular deposit is found chiefly in the upper lobes, while other morbid degenerations occupy all parts of the lungs indifferently. Of the causes situate external to the lungs, pleuritic effusion and effusion of blood are commonly confined to one side; hydrothorax extends to both; the tumors in the pleura and mediastina may occupy any position; diseases of the heart itself will affect the parts in the neighborhood of that organ; and aneurismal tumors chiefly the upper and anterior part of the chest.

391. *Auscultation*.—The passage of the air through the various structures of the lungs in inspiration and expiration is accompanied by certain sounds, which are easily recognized on applying the ear or the stethoscope to the chest. They vary in different parts of the chest. When the ear is applied to the neck or upper part of the sternum during inspiration, a hollow, blowing sound is heard: this is tracheal respiration; on each side of the upper part of the sternum, between the scapulæ, and sometimes in the axillæ, a whiffing tubular sound is heard: this is bronchial respiration; on most other parts of the chest a sound is heard which has been compared to that of a sleeper breathing gently through the nostrils, or to the sighing of a gentle breeze: this is called vesicular, from its presumed seat, the air-cells. The student should familiarize himself with these sounds, especially the latter, by applying the ear to the healthy chest; and as this sound is most distinct in children, he should examine it in them. This same sound is heard in expiration; but it is less distinct, and of shorter continuance.*

392. The intensity of the sound varies in different healthy persons, and in the same person at different times. It is more intense, as has been stated, in young children; and also in females, a fact which may, perhaps, be accounted for by the increased respiratory effort necessitated by the confinement of the chest by stays. It is also augmented by deep inspiration; hence, when the sound is naturally dull, it may be pro-

* It is generally stated that in expiration the bronchial and tracheal sounds alone are heard (see Lib. of Med., vol. iii., p. 11: art. Diagnosis of Diseases of the Lungs, by Dr. Williams): but this statement is controverted in an able review of Fournet's work, in the Brit. and For. Rev. for April, 1840.

duced by causing the patient to breathe quick, or to draw a deep breath, or to cough, whereby the lungs are emptied, and a full inspiration secured. The respiratory murmur is also rendered more intense in one part of the chest by any impediment to the respiration in the rest of the lung: in this case it is called *puerile*, from its resemblance to the respiratory murmur of the child. Such partial increase of intensity is a pretty certain sign of consolidation of the remaining portion of the lungs.

393. This sound is sometimes scarcely perceptible, and the absence of it is not always a sign of disease. As a general rule, it may be stated, that where the absence of this sound does not coexist with any other morbid sounds, or with dullness on percussion, it should not be regarded as an indication of disease. The respiratory murmur may be absent in limited portions of the chest, in consequence of the bronchial tubes being obstructed by tenacious mucus; but here percussion will give a clear sound; or it may be absent, because the air-cells are filled with fluid from within, or compressed from without. In this case the chest will sound dull on percussion, except where the pressure is occasioned by air in the pleura (*pneumothorax*).

394. The *bronchial* respiration in the healthy state is only heard in parts of the chest corresponding with the track of the large bronchial tubes; but if the lung is condensed, from whatever cause, it not only loses its proper respiratory murmur, but, becoming a better conductor of sound, conveys to the ear the sound produced in the bronchial tubes. Hence, bronchial respiration heard with unusual distinctness near the site of the bronchial tubes, or heard on one side, when not audible on the other, or with widely-differing intensity, or in parts where it is not heard in health, is an indication of consolidation of the lung by inward disease or outward pressure.

395. The bronchial respiration, as thus heard, assumes different characters; sometimes resembling *puerile* respiration in an intense degree; at other times, the noise made by drawing the breath through the closed hand; at others, that occasioned by blowing into a quill; at others, the short puff used in blowing out a candle.

396. To the same class of sounds belongs the so-called *cavernous* respiration, which, in its more marked form, produces a perfect illusion of air drawn through the stethoscope during inspiration, and puffed into the ear during expiration. This arises either from dilated bronchi, or, more generally, from an excavation in the substance of the lung.

397. The *amphoric* respiration closely resembles the sound produced by blowing into a bottle, and is caused by the passage of air into a cavity lined with a dense membrane.

398. Besides the respiratory sounds produced in the tubes and air-cells of the lungs, and occurring when those parts are moistened by their natural secretions, and in their natural quantity, there are other sounds due to the increased resistance offered to the passage of air through those parts, by constriction of the parts themselves, or by fluids of various degrees of consistence. These sounds are called *rattles* in English, *râle* in French, and *rhonchus* in Latin. The term *rhonchus* is in most common use in this country. These sounds are further distinguished as *dry* and *moist*: the dry being due to the swelling of the mucous membrane, constriction of the tubes, obstruction from viscid phlegm, &c.; the moist to fluids of less consistence, accumulated in the several parts of the lungs.

399. Rhonchi occur in three situations: in the air-cells (*vesicular*), in the bronchial tubes (*bronchial*), and in cavities formed in the structure of the lung (*cavernous*).

400. *Vesicular rhonchi* are of two kinds: (a) *dry crepitous* or *dry vesicular rhonchus* (*râle crepitant* sec à grosses bulles, ou craquement of Laennec). This sound resembles that produced by blowing into a dried bladder. It occurs only in emphysema of the lungs, and is most distinctly heard in interlobular emphysema. It is only heard during inspiration. (b) *Moist crepitant* and *sub-crepitant rhonchus* (*râle crepitant* of Laennec). This resembles the crepitation of salt thrown on hot iron, or the sound produced by rubbing a lock of hair between the finger and thumb, or the crepitation of a healthy lung distended with air, when pressed by the hand. It exists in all cases where the smallest bronchi and air-cells are partially filled with viscid fluid, provided that they still admit the passage of air. Thus, it is present in œdema and apoplexy of the lungs, occasionally in pulmonary catarrh and bronchitis, and in the first stage of phthisis. It is also present in the first stage of pneumonia, constituting its most constant and characteristic sign; it disappears when hepatization comes on, and reappears when the inflammation is subsiding, and the lung begins to resume its healthy condition. In the first and last of these stages the moist crepitant rhonchus alters and obscures the respiratory sound, but does not completely mask it; in the stage of hepatization both sounds are absent.

401. *Bronchial Rhonchi*.—These, too, are *dry* or *moist*. The *dry* bronchial rhonchi are the *sibilant* and *sonorous*. The *sibilant* resembles a prolonged whistle, or the momentary and interrupted chirping of birds, or the sound emitted by the sudden separation of two portions of smooth, oiled stone. The *sonorous* rhonchus resembles the snoring of a person asleep, or the bass note of a violoncello or bassoon, or the cooing of a

pigeon. All these varieties of sound arise from contraction of a portion of a bronchial tube, by thickening of the mucous membrane, or by pressure of a limited portion of consolidated lung, &c.; or by a portion of tenacious mucus, the sibilant rhonchus existing probably in the smaller, and the sonorous in the larger bronchial tubes. Allied to these sounds, a sort of *click* is sometimes heard, either during inspiration or expiration, arising probably from the sudden displacement of a portion of viscid mucus adhering to the interior of a bronchial tube. The *moist* bronchial rhonchus is called the *mucous rhonchus* (*râle muqueux* of Laennec). It is due to the passage of air through tubes containing a fluid, and closely resembles the sound produced by blowing through a pipe into soap and water. It is present in pulmonary catarrh, bronchitis, and hæmoptysis; and in all diseases accompanied with much expectoration, as in the third stage of pneumonia, and in phthisis. *Tracheal* rhonchus is a mere modification of this sound, existing in the trachea when filled with fluid. It has been compared by Laennec to the rolling of a drum at a distance, or the noise of a carriage in a paved street.

402. *Cavernous Rhonchi*.—These also are *dry* and *moist*. The *dry* cavernous rhonchus is extremely rare, as the cavities in which it exists are rarely found empty. The *moist* cavernous rhonchus has its seat in a cavity in the lungs, which, in ninety-nine cases out of a hundred, is of a tuberculous origin. It consists of the bubbling or gurgling of a fluid in a *circumscribed* cavity, and forms, when well marked, the surest sign of a tuberculous excavation.

403. In addition to the sounds just described, there are others which are produced by the *voice*. If we put the ear or the stethoscope to a healthy chest, we commonly perceive a diffused resonance: this is most distinctly heard in the situation of the bronchial tubes, as, for instance, between the scapulæ. If we lay the hand on the chest while a person is speaking, especially if the voice be a bass, we perceive a vibration. This has been called *fremitus*. If, instead of applying the stethoscope to the chest, we place it over the larynx or trachea, the voice does not merely vibrate, but seems to pass through the tube to the ear, being much more clearly perceived by the ear applied to the stethoscope than by the other: this sound is called *laryngophony*. The same sound is heard when the lungs between the bronchial tubes and the parietes of the chest are condensed, and especially if the bronchi are at the same time enlarged: this is *bronchophony*. If in the cavity of the pleura, external to a condensed lung, a thin layer of fluid is deposited, as happens in recent cases of pleuritis, a sound is heard like the bleating of a goat, or the

squeaking of Punch : this is *ægophony*. Again, in cases of pulmonary excavation, the sound of the voice passes through the tube to the ear, as in laryngophony, and receives the name of *pectorilology*. Lastly, in cases where a large cavity, filled with air and communicating with the bronchi, exists in the chest, a sound is produced during respiration, by speaking, or in coughing, which resembles either the falling of a pin into a cup or glass, or that caused by blowing quickly and forcibly into a bottle with a narrow neck. The first is called *metallic tinkling*, the second *amphoric resonance* or *buzzing*. These sounds are heard most distinctly in pneumothorax ; but they also occur in large abscesses of the lungs.

404. There is one sound which, though due to an external cause, may be confounded by the beginner with sounds produced within the chest : the muscular sound (*bruit musculaire*). It is always heard during muscular contraction, and is peculiarly distinct during the tremulous action of the muscles from cold, and when the muscles are put upon the stretch. When the neck and shoulders are forcibly thrown back in examining the anterior part of the chest, when the hand is forcibly raised above the head, or the arms strongly folded across the chest, the patient stooping at the same time, this sound is very distinctly heard. It is an extremely rapid vibrating sound, bearing a close resemblance, when strongly marked, to the distant rumbling of carriages over a paved street. The pupil should make himself familiar with this sound, by placing his ear on the pillow, and contracting the masseter muscles with different degrees of force and quickness, taking care, at the same time, to avoid grating the teeth. When he closes the jaw gently, he will hear the rapid vibration just mentioned ; a stronger contraction will render the vibration still more rapid ; a strong and abrupt contraction closely imitates the first sound of the heart ; a still stronger and quicker one produces a sound which might be confounded with the "*bruit de soufflet*," and the strongest and most abrupt a species of cooing sound. The ear or stethoscope applied to the biceps muscle during a strong contraction, or to the abdominal muscles during a violent and abrupt expiratory effort, perceives a sound not easily distinguished from the first sound of the heart. The continued nature of the "*bruit musculaire*" distinguishes it at once from all the respiratory sounds.

405. It only remains to mention a sound produced external to the lungs, and in the sac of the pleura. It is a *friction*-sound, occurring both in inspiration and expiration when the pleuræ are dry and rough with deposits.

406. The following table, which presents at one view some

of the chief points just stated, may be referred to with advantage, especially by the young auscultator. It is taken, with some modifications, from Dr. Williams's article on the Diagnosis of the Diseases of the Chest, in the Library of Practical Medicine, vol. iii., p. 18.

SOUNDS PRODUCED BY THE PASSAGE OF THE AIR IN RESPIRATION.

NATURAL.

Tracheal; heard in the neck and at the top of the sternum.

Bronchial; near the upper part of the sternum, between the scapulæ, &c.

Vesicular; on most other parts of the chest.

MORBID.

Bronchial Respiration; from condensed lung.

Cavernous, } in morbid cavities, communicating with the bronchi.

Amphoric; }

RHONCHI. *Moist.* *Mucous*; liquid in bronchi.

Crepitant; viscid liquid in small tubes and air-cells.

Dry. *Sibilant*, } Produced by contraction of bronchi,
Sonorous, } by swelling of mucous membrane, by
Dry mucous. } pressure, and by tenacious mucus.
Dry crepitant; in emphysema, especially interlobular
 emphysema.

Cavernous; liquid in a morbid cavity.

SOUNDS OF THE VOICE TRANSMITTED THROUGH THE CHEST.

NATURAL.

Laryngophony; over larynx.

Tracheophony; neck and upper part of sternum.

Bronchophony; near top of sternum, between the scapulæ, &c.

(*Pectoral fremitus*; perceptible to the touch in many parts of the chest.)

MORBID.

Bronchophony; condensed lung.

Egophony; the same, vibrating through a thin layer of fluid.

Pectoriloquy; in a cavity of the lungs.

Tinkling, &c.; a changed echo of voice or cough in a large cavity.

SOUNDS PRODUCED BY THE MOTIONS OF THE LUNGS.

Friction-sounds, when the pleuræ are dry and rough from deposit.

SOUNDS PRODUCED BY THE CONTRACTION OF THE MUSCLES.

Vibratory sound, of varying intensity.

407. *Examination of the Heart.*—The heart is situated in the anterior mediastinum, within the pericardium, attached to surrounding parts by the large vessels arising from its base, and with its apex free. Its position is oblique, the base directed upward, backward, and to the right side; the apex downward, forward, and to the left; the base looking toward the fifth, sixth, and seventh dorsal vertebræ, from which it is separated by the descending aorta and the œsophagus; the apex, when the body is erect, the ventricles in a state of contraction, and the chest in a medium state of distention, corresponding to the fifth intercostal space—a point about two

inches below and one to the inside of the nipple, or two and a half from the outside of the base of the ensiform cartilage. The heart itself lies behind the lower half of the sternum, the third intercostal space, and the cartilages of the fourth, fifth, and sixth ribs; about one third of the heart, consisting of the right auricle, and the upper and right side of the base of the corresponding ventricle, lying behind the sternum, the remainder of the organ to the left of that bone.

408. The pericardium and heart are covered on each side by the lungs, and also in front, with the exception of a lozenge-shaped space of somewhat less than two inches across. The part thus uncovered by the lungs consists of the whole front of the right ventricle, the most anterior portion of the appendix of the right auricle, with the apex and external edge of the left ventricle. These exposed portions, as well as the root of the pulmonary artery and the ascending aorta, after it has emerged from behind it, are separated from the walls of the chest only by the pericardium and loose cellular tissue.

409. The orifice of the pulmonary artery and its valves, and those of the aorta, which lie nearly directly behind them, correspond to the upper edge of the fourth sterno-costal articulation of the left side, and to a point just above the left side of the fifth dorsal vertebra.

410. The auriculo-ventricular orifices of the two sides of the heart lie to the right and left respectively of these points, that of the right side being at a lower level by several lines. They are only a third of an inch apart, and lie just below the root of the pulmonary artery. The bulging portion of the pulmonary artery, just below its division, is situated, according to Dr. Hope, between the second and third ribs of the left side, close to the sternum.

411. The aorta, as it emerges from behind the pulmonary artery, comes in contact with the sternum, lying behind the median line of this bone till it forms its arch; the pulmonary artery, which is also in contact with the sternum, inclining more to the left till it reaches the space between the second and third rib. The arch of the aorta corresponds to the middle of the upper bone of the sternum; so that a sharp instrument, passed through the upper part of the sternum in the median line, and on a level with the first intercostal space, would touch the upper part of the arch of the aorta as it is passing from the right side of the sternum to the left side of the third dorsal vertebra.*

412. Though the body and apex of the heart are unattached, and merely embraced by the pericardium, the movements

* In this description I have followed very closely, and in many parts verbatim, Dr. Joy's article in the 3d vol. of the Lib. of Prac. Med.

of the heart are greatly restrained by the attachment of its large vessels to surrounding parts, and by the strong connection of the pericardium with the diaphragm below.

413. In consequence of the connection with the diaphragm, the unattached portions of the heart (the body and apex) are forced up in expiration and drawn down in inspiration; and this change of position is exaggerated by the ribs moving in opposite directions. During a deep inspiration, the apex of the heart, instead of beating in the fifth intercostal space, is felt in the sixth, but indistinctly, in consequence of the elevation of the ribs drawing the lung in front of it. In a forced expiration, on the other hand, the ribs are drawn down and brought more completely into contact with the heart, so that the beat of the heart is felt in the fifth intercostal space, and even as high as the third rib, and as low as the lower half of the sternum.*

414. A distended stomach, or an enlarged abdomen, from whatever cause, will have the same effect as the act of expiration. As those portions of the heart which are free to move are of course affected by gravity, the position and direction of the apex will vary with the posture of the body.

415. In examining the heart, three points demand attention: its *position and size*, its *motions*, and its *sounds*.

416. *Position and Size of the Heart*.—These are determined chiefly by percussion, and, in certain cases, though with less accuracy, by the touch. In healthy and well-formed persons a dull sound is elicited by percussion over an area of about two inches in diameter, extending from the point where the beat of the heart is felt to the left side of the lower half of the sternum. This space, which corresponds to the part of the heart uncovered by the lungs, yields a dull sound, both on strong and slight percussion. Beyond this space the sound, on percussion, is gradually softened off, in proportion as the thickness of the overlapping lung increases; but on strong and sharp percussion the dull sound of the heart is heard through the intervening portion of lung. When the heart is enlarged, or when the pericardium is filled with fluid, the region of dullness is increased; the same effect is also produced by the consolidation of the surrounding portions of lung, or by tumors intervening between the pericardium and the walls of the chest, or by partial pleuritic effusions confined by false membranes, or even by enlargement of the left lobe of the liver. It is only in the ascertained absence of such diseased conditions that dullness on percussion may be taken as the measure of the heart's size.

417. On the other hand, the absence of this dullness on

* Dr. Williams.

percussion does not afford certain evidence of the non-enlargement of the heart, as surrounding parts may give an unusually clear sound on percussion, and thus mask the heart-affection. Emphysema of the lung, pneumothorax, or even an unusual distention of the stomach with gas, may give rise to such a clear sound on percussion : the dullness also ceases, even in healthy persons, on assuming the recumbent posture, or on taking a deep inspiration. The persistence of a dull sound under these circumstances affords evidence either of adhesions of the heart or lungs, or of such a degree of enlargement of the heart or distention of the pericardium as prevents the heart from receding.

418. *Motions of the Heart.*—The auricles and ventricles contract alternately, the systole of the one being synchronous with the diastole of the other. The auricles first contract, then the ventricles. The contraction of the ventricles is followed by their diastole, and this by a short pause. During the diastole of the ventricles, and the short pause which succeeds, the blood flows from the auricles into the ventricles, and the contraction of the auricular appendices which immediately succeeds the pause excites the ventricles to new contraction.

419. The order, therefore, of the heart's movements is as follows : systole of auricles, systole of ventricles, diastole of ventricles, pause. This order of succession is called the *rhythm* of the heart's motions. Of the *whole* time consumed by these several movements, the contraction of the ventricles occupies a half, the diastole a fourth, and the pause a fourth.

420. The *impulse* of the heart is synchronous with the contraction of the ventricles and the pulse in the larger arteries. It was formerly attributed to the tilting of the apex of the heart against the ribs, but it is now understood to depend on the sudden change of shape, accompanied by rigidity, which the heart undergoes, this change consisting of a bulging of its anterior surface through its entire length. The effect of this sudden bulging of the rigid parietes of the ventricles is felt chiefly at the apex, because a thick mass of spongy lung, which absorbs and neutralizes the force of the impulse, intervenes over the rest of the heart's surface. A full expiration, by diminishing the size of the intervening portion of lung, extends the limits of the impulse, and the same result follows when the body is placed in a prone position.

421. The strength of the impulse, and the extent of surface over which it is felt, vary greatly in disease. When the parietes of the heart are thickened at the expense of the cavities (concentric hypertrophy), the extent of impulse being scarcely greater than natural, its force is much augmented.

When, on the other hand, the ventricles are diminished in thickness, the impulse is less forcible. If thickening of the walls is accompanied by increase of the size of the cavities, in which case the heart will be greatly enlarged, the impulse is both stronger and more extensive, and may become perceptible over a space of five or six square inches. When the walls are thin and the cavities enlarged, the impulse will be of less force, but of greater extent.

422. Fluid in the pericardium renders the impulse indistinct, and the place in which it is felt variable. Adhesions between the heart and pericardium, on the contrary, confine the impulse to the same spot, so that change of posture, and the different states of the parietes of the chest in inspiration and expiration, have little or no effect upon it. Tumors formed within the chest and various diseases of the lungs may displace the heart, and cause the spot in which its impulse is felt to vary. Congenital transposition of the heart will have the same effect. The impulse will be more distinctly felt, *cæteris paribus*, when the contraction of the ventricles is abrupt. When the heart acts strongly, and especially in emaciated subjects, its movements may be seen as well as felt, and their force, extent, and nature will often furnish useful indications. When the heart is enlarged, these movements may be distinctly perceived in the epigastric region.

423. The heart is also subject to various irregularities in its action; as double and triple impulse, depending generally on spasmodic and partial contraction of the ventricles, and on irregular transmission of blood from the auricles; to intermittence, inequality, increased or diminished force, &c. As most of these irregular actions of the heart affect the pulse, and produce appreciable changes in it, they will be best considered under that head.

424. *Sounds of the Heart.*—The natural sounds of the heart are two in number: a dull, prolonged sound, synchronous with the impulse of the heart, and consequently with the contraction of the ventricles and the pulse in the larger arteries, and an abrupt, clear sound. The second sound immediately succeeds the first, and is followed by an interval of silence. The first sound is loudest over the middle of the ventricles, the last over the site of the semilunar valves, and for a short distance upward along the sternum. They are best distinguished when the pulse is slow, and they are more clear in emaciated than in stout persons. We may hear them in our own persons when lying down, especially on the left side; and in rare instances of disease they have been heard even at a short distance from the patient. The intensity of the sound diminishes as the distance from the præcordia increases.

425. In stout persons, the sounds are limited to the region of the heart itself; in narrow-chested persons, and in children, they may be heard all over the chest, before as well as behind. Any cause which increases the conducting power of the contents of the chest extends the limits within which the sounds are heard. Thus, when the lungs are consolidated, as in pneumonia, phthisis, &c., the sounds of the heart are heard much beyond their usual limit. Should consolidation be confined to the right side, the sounds of the heart would be heard more distinctly on that side, both before and behind, than on the left, and this fact may become a means of diagnosis.

426. *Cause of the Sounds.*—Much difference of opinion has existed on this subject, and many careful experiments have been made. The majority of medical men now agree in attributing the first sound to the contraction of the ventricles, and the second sound to the reaction of the column of blood in the aorta and pulmonary artery on the semilunar valves, by which those valves are suddenly closed with a sort of click. Some high authorities, of whom the most recent is M. Cruveilhier, attribute both sounds to the closing of the valves, the first sound being due to the closing of the tricuspid and mitral valves, the second to the closing of the semilunar.

427. In support of the opinion which attributes the first sound to the contraction of the ventricles, it may be stated that the "bruit musculaire" is certainly a sufficient explanation; for no one who has placed his head upon the pillow, and contracted his masseter muscles with varying degrees of force and rapidity, can have failed to recognize the first sound of the heart in every degree of distinctness which it exhibits in healthy persons, from the dull, prolonged sound which it has when the circulation is tranquil, up to the cooing sound which accompanies its more powerful and rapid contractions. It is a strong confirmation of this view that a strong contraction of the abdominal muscles produces a sound not to be distinguished from it.*

428. The sounds of the heart may be changed in intensity or in kind. An increase or diminution of *intensity* is of very common occurrence. An increased loudness of sound is often heard during nervous palpitations, both by the patient himself and by his attendants; it may also be produced by dilatation of the ventricles, accompanied with thinness of their parietes. In the former case, the impulse is at the same time increased; in the latter, diminished. On the other hand, the sounds may become so feeble as to be heard with difficulty, as is the case

* Report on the Motions and Sounds of the Heart. Transactions of the British Association, 1841.

in general debility, or in debility of the heart itself, in obstructed pulmonary circulation, in cases where the heart is overloaded with blood, in softening of its fibres, and in excessive hypertrophy. In the latter case, there will be strong impulse with weak sounds.

429. In cases of nervous palpitation, and after violent exercise, both sounds of the heart are unusually distinct, the action of the muscular fibres being strong and abrupt, and the elastic reaction of the aorta closing the valves with a sudden jerk: hence the loudness of the first sound and the peculiar abruptness of the second.

430. But besides these differences in degree, there are other sounds present in certain unusual or diseased conditions of the circulation. Some of these belong to the heart, and others to the blood-vessels. They are the following: the *bellows sound* (bruit de soufflet), the *simple blowing sound*, the *hissing sound*, the *sawing sound* (bruit de scie), the *rasping sound* (bruit de râpe), a *humming sound* (bruit de diable), a *buzzing sound* (bruit de mouche), a *whizzing sound*, and peculiar musical sounds, such as cooing, whistling, &c.

431. The sounds heard over the region of the heart itself, or in the large vessels which spring from it, are chiefly the bellows sound and its modifications, viz., the sawing or rasping sound, and the several musical sounds.

432. The *bellows sound* is always produced when there is a marked disproportion between the force of the heart's contractions and the size of the tubes or orifices through which the blood has to pass. It may arise: 1. in persons in perfect health during very violent contraction of the heart, the arteries retaining their normal size, as in nervous persons during violent palpitations, the heart contracting both quickly and forcibly; in chlorotic females, arising, as it is thought, from a thin condition of the blood; and in cases of great debility from sudden hæmorrhage. In all these cases, the sound is not constant. 2. From narrowing of the orifices, the heart contracting with its usual force, or with increased violence; as where the orifice of the aorta or pulmonary artery is contracted, with or without enlargement and hypertrophy of the corresponding ventricle. 3. From narrowing of the orifices in consequence of diseased formations, as vegetations and diseased incrustations on the valves, the consequence of inflammation, or from polypous concretions formed during life. 4. Dilatation of one or more of the orifices of the heart, with inefficiency of the valves, as in cases of adhesion of the aortic or auriculo-ventricular valves to the adjacent parietes. [5. A bellows sound is occasionally produced by the action of the enlarged heart against the portion of the lung interposed between it and the

walls of the chest. When it arises from this cause, it will immediately disappear when the patient holds his breath.]

433. Most of these cases resolve themselves into a disproportion between the force of the heart's beat and the size of the orifices, or into some obstacle to the flow of blood. The position in which they are heard, and the sound of the heart which they accompany, will often enable us to fix upon the precise seat and cause. Thus, sounds heard only in the region of the heart or over the position of its valves, but becoming indistinct when the ear is made to follow the course of the arch of the aorta, may be ascribed to disease of the auriculo-ventricular valves, or of the pulmonary artery; or to causes external to the heart itself, and having the pericardium for their seat. On the other hand, sounds heard over the position of the valves, and remaining equally distinct or increasing in distinctness, as the ear follows the course of the aorta, may be referred to diseases of the aorta or its valves; to enlargement with or without roughness of the aorta, or to induration or patency of the semilunar valves. When the sounds are limited to the heart, and are due to internal causes, the mitral valve is the most likely seat of the disease. Of the two large arteries, the aorta and the pulmonary artery, the aorta is much the most liable to alterations of structure.

434. If the abnormal sounds accompany the first beat of the heart, they are most probably due either to disease of the auriculo-ventricular orifices of the valves of the arteries, or of the coats of the arteries themselves. Where they accompany the second sound, they are most likely to arise from disease of the aortal valves. If they are heard with both sounds, they may be complications of auriculo-ventricular with aortal or pulmonary disease, or of disease of the aorta as well as of its valves. The position in which they are heard must be taken into account in all these cases.

435. The sounds heard in the position of the heart, and which arise from causes external to it, are friction sounds, generally double, and in rare cases triple or fourfold. They arise from depositions of coagulable lymph on the surface of the pericardium, or from other morbid formations in the same situation. These sounds, too, are of limited extent, and are not heard in the course of the large vessels. They resemble those produced by depositions of lymph on the surface of the pleura, and vary in intensity, from a sound closely allied to the *bruit de soufflet*, to the harsh, creaking sound produced by the folding of new leather.

436. In cases of abnormal sound, the hand applied over the spot where the sound is heard perceives a peculiar *thrilling*, *vibratory motion*, resembling that felt on touching the back of

a cat in the act of purring. This has been named the purring tremor (*freuissement cataire*); a similar thrill is sometimes felt over an aneurism, or in the healthy arteries themselves.

437. The sounds heard in the blood-vessels remote from the heart consist chiefly of the bellows murmur in different degrees of intensity, which may always be produced both in the arteries and veins by the pressure of the stethoscope, but is most distinctly heard in chlorotic females, and after hæmorrhages. It is heard in the veins of the uterus during pregnancy, but may be readily produced by pressure of the stethoscope on the iliac veins; hence the necessity of using caution in these examinations.

438. The humming sound (*bruit de diable*) and the buzzing sound (*bruit de mouche*) are also heard in different states of the vessels, and may be produced in the large veins by the pressure of the stethoscope.

439. Other sounds heard in the blood-vessels are the peculiar whizzing or grating sound of aneurism, and a similar sound from the passage of blood through an accidental opening in an artery into a vein (*aneurismal varix*).

440. Much information may be obtained by placing the hand upon the pulse at the wrist, at the same time that the ear is applied to the seat of the abnormal sounds. In the case of sounds heard in the region of the heart, and attributed to disease of the auriculo-ventricular valves, if the sound precede the pulse we may attribute it to the entry of the blood into the ventricle; if it is synchronous with it, to reflux. In this latter case, the presence or absence of the venous pulse, that is to say, the pulsation of the large veins caused by regurgitation of the blood into them, will enable us to decide as to which side of the heart is the seat of the disease.

THE ARTERIAL PULSE.

441. By the ear or by the hand applied to the region of the heart we may count the number, the force, the quickness, the regularity, and the degree of equality of its beats; but the pulse teaches us this and something more. It is a measure not only of the number, force, quickness, regularity, and degree of equality of the heart's contractions, but also of the quantity of blood sent forth at each beat. Hence it is a better measure of the circulation. It would be a perfect one were it not that the coats of the arteries vary in their degree of contractility. But this variation, while it impairs the value of the pulse as a measure of the circulation, gives it an additional claim to attention as a criterion of the state of the nervous system; for this it is which modifies the contractility of the arteries.

442. The fallaciousness of the pulse has passed into a proverb, and the proverb has furnished a good excuse for the neglect with which it has been treated. Substitute the word "difficult" for the word "fallacious," and we have a motive for industry instead of an apology for idleness. The pulse can only be fallacious to the extent to which we are ignorant of it; it will always remain difficult even to those who understand it best. The difficulties which attach to the subject are the same which beset every part of the study and practice of medicine, and they spring from the same causes, of which the chief are the original difference in degree existing between all the functions of the human body in health, the variable intensity of the causes of disease, and the numerous combinations of which those causes are susceptible.

443. Some precautions are necessary in examining the pulse, and some directions are required. The first precaution to be observed is, to wait a certain time till the emotions commonly occasioned by the presence of the medical attendant have subsided, for such emotions have a marked effect upon the circulation. The mode in which the pulse is felt is also of some consequence. For the purpose of counting the number of beats, a single finger may be used; but in order to observe the more minute changes which it undergoes, the four fingers of the opposite hand should be applied in the course of the radial artery with a moderately firm and equal pressure. By compressing the artery with the ring or little finger, we can ascertain by the fore-finger the degree of compressibility. In infants and very young children it is often difficult to count the pulse at the wrist, and in these cases the beat of the heart should be preferred.

444. Of all the characters of the pulse, its frequency is that which is most easily ascertained. This usually corresponds with the number of the heart's contractions: it can never exceed that number, though it may fall short of it. In certain forms of disease of the heart, the quantity of blood which the ventricles receive is so small, that it makes no impression on the mass of the circulating fluid, and the impulse does not reach the radial artery; or the heart contracts without having any blood in it; or some pressure, temporary or permanent, may exist in the course of the artery: in all these cases the pulse is imperceptible, and we miss some of its beats. In syncope, too, all the beats of the heart are so feeble that no pulse can be felt at the wrist. These are some of the few exceptions to the rule that the pulse is an accurate measure of the frequency of the heart's contractions. The following are some of the causes which influence the number of the pulse in health:

445. AGE.—*Infancy*.—The frequency of the pulse is very variable in young infants. According to Quetelet, the numbers immediately after birth, both for males and females, are as follow :

Maximum, 165 ; Minimum, 104 ; Mean, 135 ; Range, 61.

The following numbers are taken from Billard ; the averages are approximations :

	Max.	Min.	Mean.	Range.
1 to 10 days,	180 ; less than 80 (in 18),	106 ;	more than 100	
1 to 2 months,	150 ; " " 70	"	103 ; " " 80	
2 to 3 months,	100 ; " " 70	"	87 ; " " 30	

Hence it appears, that the pulse of the infant at birth, and for some time after, has a very variable frequency, and is little to be depended upon as a test of the state of the health.

446. From infancy till toward the middle of life, the pulse progressively diminishes in frequency, to increase again slightly in the decline of life. The following table, founded upon between 600 and 700 observations, of which the greater number were made by myself, shows the average and extreme numbers of the pulse, without distinction of sex, time of the day, or posture of the body. The number of observations at each age was either 20 or 25 :

Age.	Max.	Min.	Mean.	Range.
1	158	108	128	50
2	136	84	107	52
3	124	84	106	40
4	124	80	105	44
5	133	80	101	53
6	124	70	95	54
7	128	72	90	56
8	112	72	92	40
9	114	65	87	49
10	120	76	91	44
11	100	56	84	44
12	120	70	94	50
13	112	70	84	42
14	114	68	86	46
15	112	60	84	52
16	104	66	83	38
17	102	54	76	48
18	104	58	74	46
19	108	60	76	48
20	106	52	72	54
21	99	59	74	40
22	96	41	68	55
23	100	60	74	40
24	84	52	71	32
25	88	59	73	29

447. The following table presents the number of the pulse at different ages, deduced from an average of twenty-five observations at each age specified. All the observations were made by myself, in apparently healthy persons, fasting, in a

state of rest, in the middle of the day, and in a sitting posture :

Age.	Males.				Females.			
	Max.	Min.	Mean.	Range.	Max.	Min.	Mean.	Range.
1 week.	160	104	128	56	160	104	128	56
2 to 7 years	128	72	97	56	128	70	98	58
8-14	108	70	84	38	120	70	94	50
14-21	108	60	76	48	124	56	82	68
21-28	100	53	73	47	114	54	80	60
28-35	92	56	70	36	94	62	78	32
35-42	90	48	68	42	100	56	78	44
42-49	96	50	70	46	106	64	77	42
49-56	92	46	67	46	96	64	76	32
56-63	84	56	68	28	108	60	77	48
63-70	96	54	70	42	100	52	78	48
70-77	94	54	67	40	104	54	81	50
77-84	97	50	71	47	105	64	82	41

[According to M. Trousseau, the average pulsation of infants from eight days to six months old is 131 for boys, and 134 for girls; from six to twenty-one months, the average for boys was 113, and for girls 126; he also found the extremes to vary frequently far above and below the average.]

448. The pulse of the adult male, then, may be stated at 70, that of the adult female at 80; the highest number is somewhat less than 100 in the adult male, and somewhat more than 110 in the adult female; the least number in each is about 50. The range (the difference between the highest and lowest numbers) extends from 23 to 56 in the male, average 43; and from 32 to 68 in the female, average 48. The lowest number recorded in the table is 48, and the lowest observed by Floyer was 55.

449. Much lower frequencies have, however, been met with in healthy persons. Heberden records 42, and 30, and even 26 beats in a man of 80; Fordyce, 26, in an old man in the Charter House; in a young man whose pulse is not included in the table, as he labored under slight dyspepsia, I have repeatedly counted as low as 38 beats; and this is the lowest I have met with in many hundreds. Pulses as low as 16, or even 14 beats, are on record, but it is doubtful whether the persons in whom they occurred were healthy. Falconer has observed pulses of very low frequency in women, viz., one of 36, and another of 24; and Dr. Graves mentions one of 38.

450. In disease, extraordinarily low frequencies of the pulse have been observed: one case is reported by M. Piorry, in which it beat 17 times in a minute; in a case of epilepsy by Sir W. Burnett, the number was 14; and in a remarkable case of injury to the upper part of the spine, followed after an interval by fits of syncope with convulsions, the pulse was usually about 33, but fell during the fits to 12, 10, 8, "and at three

or four different times, when the patient was quite sensible, and not in a fit," seven and a half in a minute.* These low frequencies of the pulse are generally little affected by stimuli, and, as in the case reported by Dr. Graves, remain unaltered by febrile attacks.

451. It is extremely probable, on the other hand, that exceptions may exist to the frequency of the healthy pulse, of an opposite kind; that is, cases of great frequency; but I have not met with any well-authenticated instances. In disease extraordinary frequencies of pulse have been counted. Dr. Joy has counted 200 in a case of acute hydrocephalus, and I am credibly informed by a medical man, a near neighbor of my own, that during occasional violent fits of palpitation he has counted in his own person 250 beats in the minute, and that a medical friend who called to see him in the fits corroborated his statement as to the number. Heberden counted a pulse of 180, though Floyer thinks that the greatest number which can be distinctly counted is 140. I have myself counted upward of 170 in a case of phthisis, and in a case of typhus fever, occurring in a boy 10 years of age, and during the rapid formation of diffused abscess of the arm, I distinctly counted 264 beats in the minute, being nearly 9 beats in two seconds.

452. *Sex*.—It will be seen, by comparing the two columns of the foregoing table, that the pulse of the female has nearly the same frequency as that of the male up to 7 years, but that at more advanced periods of life the female pulse exceeds the male by from 6 to 14 beats, the average excess being 9 beats. The pulse, too, has a greater range in the female than in the male; that is to say, there is a greater difference between its highest and lowest numbers. This happens in consequence of the female pulse being much more frequent in many instances than the male, while in others it falls nearly as low.

453. *Temperament*.—Nothing is known with certainty of the influence of temperament on the pulse. It is probable that the pulse is more frequent in the sanguine and nervous than in the lymphatic and bilious.

454. *Posture*.—In the healthy adult male the mean frequency of the pulse in the different postures is as follows:

Standing, 79; sitting, 70; lying, 67; including all exceptions to the rule.

Standing, 81; sitting, 71; lying, 66; excluding all exceptions to the rule.

In the adult female of the same mean age, the numbers are,

* *Medico-Chir. Trans.*, 1841; Reporter, Mr. Holberton, of Hampton.

Standing, 89 ; sitting, 82 ; lying, 80 ; including all exceptions to the rule.

Standing, 91 ; sitting, 84 ; lying, 80 ; excluding all exceptions to the rule.

455. The extremes, however, are very remote from these mean numbers. Thus, in the male, the difference between standing and sitting has been observed as high as 26 and as low as 0 ; that between sitting and lying as high as 18 and as low as 0 ; and that between standing and lying as high as 44 and as low as 0. In the female, in like manner, differences scarcely less marked have been observed. Numerous exceptions also exist to the rule that the pulse is more frequent sitting than lying, and standing than sitting. All these facts should be borne in mind at the bedside. The effect of change of posture on the same frequency of the pulse is nearly twice as great in the male as in the female, and nearly three times as great in adults as in early youth.

456. The effect of change of posture increases with the frequency of the pulse, as is seen in the following tables :

MALES.				
	51-70	71-90	91-110	111-130
Standing	61	81	101	120
Sitting	55	68	82	93
Lying	52	67	74	81
Difference between } standing and lying }	9	15	27	39
FEMALES.				
	61-80	81-100	101-120	
Standing	71	92	108	
Sitting	67	85	97	
Lying	63	83	90	
Difference between stand- } ing and lying }	8	12	18	

457. The exceptions to the general rule also decrease as the frequency of the pulse increases, and, for the higher frequencies of the pulse, entirely disappear. Hence change of posture admits of practical application in cases where the pulse is much increased in frequency. The effect of change of posture on the same frequency of the pulse is greater in the morning than in the evening. When the head is placed lower than the body, the pulse falls.

458. The cause of the different frequency of the pulse in different postures is the different amount of muscular contraction required to support the body in those postures.

459. The effect of change of position is much increased by debility ; it is greatly diminished in phthisis pulmonalis. The pulse is said by Dr. Graves to be unaffected by posture in hy-

peritrophy of the heart, but this statement requires confirmation.

460. *Period of the Day.*—The pulse of the healthy male, as a general rule, is more frequent in the morning than in the evening, and diminishes progressively as the day advances. To this rule there are probably some exceptions. There is some reason, also, to believe that this rule may be inverted in the female. The pulse also falls more rapidly and uniformly in the evening than in the morning. It is also a general rule, that exciting causes of all kinds act more powerfully in the morning than in the evening.

461. In experiments made upon my own person, I found that the effect of the same food on the same frequency of the pulse was, taking one experiment with another, nearly twice as great, and lasted more than three times as long, in the morning; while in more than one instance, the same food which in the morning raised the pulse from 5 to 12 beats, and kept it above its natural number for one or two hours, produced no effect whatever in the evening. This fact has an important bearing on the administration of food and remedies in disease.

462. *Sleep.*—The pulse falls considerably in sleep. In Quelet's observations, there was a difference of 10 beats in an adult female, the same difference in a girl from three to four years old, and in a boy from four to five years a difference of 16 beats. Sleeplessness excites the circulation. [The states of sleeping and waking exercise a considerable influence on the state of the pulse in children. Trousseau ascertained that the average pulsation, in sleep, in infants from fifteen days to six months, was 121, and when awake, 140; from six to twenty-one months, 112 when asleep, and 128 when awake.]

463. *Exercise.*—Muscular exertion increases the frequency of the pulse more than any other cause. It may raise it to upward of three times its natural frequency. Change of posture is but a particular case of this. After severe and long-continued exertion, as I have ascertained experimentally, the pulse suffers the same collapse as the other functions, and falls much below its natural number. Passive exercise also excites the pulse.

464. *Food.*—The pulse is but little affected by vegetable food, more by animal substances, and most of all by warm drinks. Spirituous liquors and tobacco, even though used habitually, increase the frequency of the pulse. Cold liquids lower it.

465. *Mental Emotions.*—These have a marked effect on the pulse, the exciting passions increasing its frequency, the depressing passions lowering it. The apprehensions which pa-

tients feel in the presence of their physician is well known to excite the pulse, and the caution to wait till the excitement has ceased before the pulse is counted is as old as Celsus.

466. *Temperature of the Air.*—Cold air lowers the pulse, warm air excites it. In Sir C. Blagden's experiments, in which he exposed himself during eight minutes in air heated to 260°, the pulse was 144, or double its natural frequency.

467. *Density of the Air.*—On the summit of Mont Blanc, De Saussure found the pulses that beat 49, 66, and 72 times respectively at Chamounix, raised to 98, 112, and 100.

468. *Quantity of Blood contained in the System.*—The pulse is more frequent in that degree of plethora which falls short of overloading the heart with blood; its frequency is but little increased where the heart is oppressed. Compression of the arteries raises the pulse by producing the first degree of plethora. A slight diminution of the quantity of blood lowers the pulse; a considerable diminution raises it.

469. *Debility.*—In debility without disease the pulse falls, but its frequency is increased in extreme debility, or where debility is complicated with irritation.

470. The more common causes of increased frequency of pulse in healthy persons, then, are the following: muscular exertion, active and passive exercise, a change from a posture requiring little muscular effort to one requiring more exertion, food (especially warm drinks), a high temperature, diminished pressure of the air, extreme debility, sleeplessness, the first degree of plethora, and exciting passions and emotions.

471. The principal causes of diminished frequency, on the other hand, are: sleep, fatigue (provided it be not carried to excess), continued rest, debility without disease (provided that the debility be not extreme), depressing passions, cold applied externally or taken internally, increased atmospheric pressure, a change from the standing to the sitting, or from the sitting to the recumbent posture, and the inverted position of the body.

472. Other characters of the pulse, besides its frequency, deserve notice. The pulse of the healthy male may be described as regular, moderately full, compressible, and rising rather slowly under the finger; that of the female is smaller and quicker in the beat, as is also the pulse of the child. The pulse of persons of a sanguine temperament is full, hard, and quick; that of the lymphatic temperament slower in the beat. In old age the pulse is often rendered hard by the increased firmness of the arteries.

473. Exceptions also occur in healthy persons to the regularity of the pulse, instances having been observed in which the pulse was irregular, or even intermittent, in health, and

regular in disease, resuming its intermittent character on recovery. In some persons this irregularity occurs on every slight attack of indigestion, especially where much flatulence is present.

474. The frequency of the pulse, though a point of much importance, is by no means the only one which demands the attention of the practitioner; there are other characters of at least equal value. The following description and explanation of them will be found useful:

475. The impression communicated to the finger by the pulse is compounded of the beat of the heart, the reaction of the aorta and large vessels, the condition of the coats of the artery itself, and the consistence of the blood.

476. The characters of the pulse which depend upon the degree and mode of the heart's contraction, are the following:

Number of the heart's contractions.—Pulse *frequent, infrequent*.

Regularity of the heart's contractions.—Pulse *regular, irregular, intermittent* (this last term should be applied to an arrest of the heart's action occurring at regular intervals).

Quantity of blood expelled at each contraction of the heart. Pulse *large* (full), *small*. If the quantity sent out at each beat is the same, the pulse is *equal*; if different, *unequal*.

Time occupied by each beat of the heart.—Pulse *slow* (laboring), *quick*.

477. The influence of the elastic reaction of the large arterial trunks on the pulse is shown in cases of dilatation of the aorta with loss of elasticity, and in aneurism. The firm and strong reaction of the healthy elastic coat produces a steady pulse, the absence of this reaction occasions the peculiar *thrilling* pulse of aneurism. The degree of elasticity of the arteries themselves produces the following modifications:

Elasticity of the arteries increased.—Pulse *hard* (strong, sharp, wiry, incompressible).

Elasticity of the arteries diminished.—Pulse *soft* (weak, yielding, compressible).

Elasticity lost in the large arterial trunks.—Pulse *thrilling, vibrating*.

478. The foregoing characters of the pulse are rarely, if ever, met with separate, but admit of various combinations, of which the following are the most important:

Pulse *frequent, large, soft* (compounded of a frequent beat of the heart, a large quantity of blood sent out by each contraction, and an inelastic artery). This pulse accompanies the premonitory stage of many febrile and exanthematous diseases, such as scarlatina, cynanche tonsillaris, erysipelas, &c. A similar pulse exists in the first stage of pneumonia.

479. Pulse *frequent, quick, small* (compounded of a frequent beat of the heart, a quick contraction, and a small quantity of blood sent out at each beat). This is the characteristic pulse of phthisis in males, and of anæmia in females. In a moderate degree, indeed, it is the character which distinguishes the female pulse, and which is present in an exaggerated form in all the less severe disorders of the female.

Pulse *frequent, large, hard* (compounded of a frequent beat of the heart, a large quantity of blood sent out at each beat, and an elastic artery). The pulse of the first degree of plethora.

Pulse *rather frequent, full, slow* (laboring), (compounded of a rather frequent ~~and~~ a slow beat of the heart, and a large quantity of blood sent out at each contraction). The pulse of a greater degree of plethora, the heart overloaded with blood.

Pulse *frequent, large, hard, quick* (compounded of a frequent and quick beat, a large circulation of blood, and an elastic artery). The pulse of inflammatory fever.

Pulse *frequent, large, hard, thrilling* (compounded of a frequent beat of the heart, a large quantity of blood sent out at each beat, an elastic artery at the wrist, with a loss of elasticity in the large arterial trunk). The characteristic pulse of aneurism and of dilatation of the aorta without obstruction to the flow of blood.

Pulse *unequal and irregular, frequent or infrequent* (compounded of a variable quantity of blood sent out at each contraction, and of contractions performed in unequal times). As the quantity of blood sent forth by the heart may depend upon one of two causes—a diminished supply from the auricle, or a want of power in the heart to send forth all the blood which it receives—this pulse may indicate mitral valve disease, or atrophy of the heart. It may depend, also, on causes which render the supply of blood to the left auricle variable. Hence it occurs in some diseases of the lungs.

Pulse *infrequent, large, hard* (compounded of an infrequent beat of the heart, a full supply of blood, and an elastic artery). A pulse often met with in apoplexy before depletion has been practiced, in hydrocephalus, compression of the brain, narcotism, &c.

Pulse *infrequent, quick* (compounded of an infrequent and a quick beat of the heart). A pulse sometimes met with in the hysteric female, and in very rare cases of pulmonary consumption in the male.

480. These are some of the many combinations of the chief elements, so to speak, of the pulse. They are given partly as examples of the employment of terms, and partly as hints

to those who may wish to follow out the study of the pulse. Taken in combination with other symptoms, the pulse furnishes important indications in all diseases; while in some cases of frequent occurrence, as phthisis pulmonalis and affections of the heart, it often forms the earliest clew to the existence of an obscure and lurking malady. Practice alone can make the physician acquainted with the principal characters of the pulse; but the knowledge acquired will amply repay the labor bestowed.

481. Besides the simple characters of the pulse already mentioned, others of less frequent occurrence and more obscure nature have been mentioned by authors, of which the following are examples. The redoubled pulses (*dicrotus, bisferiens, bisiliens*), when two strokes follow each other rapidly, and are separated from the two succeeding by an interval of repose; a pulse which is said to indicate approaching hæmorrhage; the *incident* pulse (*incidens, inciduus*), when the second pulsation is weaker than the first, the third than the fourth, after which there is a stroke as strong as the first, and so on; this is the critical pulse of the old writers; the *pulsus caprisans*, admirably named, but rarely felt: it consists in a small pulse, succeeded after a short interval by a large one, conveying the impression of an unsuccessful effort, followed by the overcoming of an obstacle.

THE RESPIRATION.

482. The products of respiration have already been mentioned (sec. 121, *et seq.*). It only remains to speak of the mechanism by which these important changes take place. The bronchial tubes divide into extremely minute branches, provided, like the efferent ducts of glands, with muscular fibres, and terminating each in a distinct cell. Around the cell a small artery, with its accompanying vein, forms a capillary network, and the blood, which circulates through these vessels, is exposed to the air which the cell contains.

483. The lungs, then, closely resemble a large gland, the minute terminations of which, like the acini of the liver and kidneys, are surrounded by a delicate tissue of blood-vessels; but they differ from other glands, inasmuch as their efferent ducts, viz., the air-passages, supply them with a material in some way or other essential to their proper secretion. In all other glands the secretion is formed from the blood alone; in this the blood is exposed to the air, the contact of which is essential to the performance of the functions of the organ.

484. A provision is made for a constant renewal of the air in the movements of inspiration and expiration. Inspiration consists in the descent of the diaphragm, and the raising and

tilting outward of the ribs. The descent of the diaphragm is accompanied by the protrusion of the abdomen. Expiration, when perfectly tranquil, is performed merely by the elastic reaction of the ribs and the resiliency of the lungs themselves, which have been shown to possess a very considerable degree of elasticity. In violent inspiration, other muscles besides the diaphragm and intercostals are called into play, especially those by which the scapulæ are raised and fixed. In violent expiration, as in coughing, &c., the abdominal muscles are brought into action, by which the viscera of the abdomen are compressed and the diaphragm forced upward into the chest. Yawning, sighing, &c., are forms of deep inspiration; coughing, sneezing, &c., of violent expiration.

485. The deep inspirations relieve the circulation by leaving greater space for the admission of blood into the heart, while violent expirations are chiefly of use by freeing the lungs or air-passages of noxious and irritating substances.

486. The peculiarity of the muscles of respiration is, that they are endowed both with a voluntary and an involuntary action. Their involuntary character subjects them to the same influences as the other involuntary muscles, while their subordination to the will renders them liable to all those affections of the voluntary muscles in which volition is suspended or impeded. Hence they are affected in hysteria, in chorea, and in tetanus. For the reasons now stated, the movements of respiration are deserving of very careful study, and of much more attention than they have yet received.

487. As the muscles of respiration are subject to the influence of the will, it is necessary, in experiments, or observations upon the number and character of the respirations, to avoid this source of fallacy. I have succeeded in accomplishing this purpose by the invention of an instrument which registers the number of respirations during a considerable interval, without requiring any attention on the part of the experimenter.

488. At the bedside, the same object may be secured when the patient is lying down, by resting his hand on the abdomen as if with a view of counting the pulse. By relaxing the grasp upon the wrist, and allowing the hand to rise and fall with the movements of respiration, the number of respirations may be counted. In this manner the interference of the will, which is always called into play when the attention of the patient is attracted to his breathing, is avoided. By this means, too, the pulse and respiration may be counted in succession, and compared with each other.

489. *Number of the Respirations.*—The number of the respirations is subject to still greater variety than that of the pulse,

and has been still less inquired into. Little is hitherto known on the subject beyond a few rude estimates. The number of inspirations in a minute is usually stated at 18, or about one to every four beats of the pulse. It is variously stated by authors for the adult male at from 14 to 26 respirations in the minute.

490. The respiration, like the pulse, varies in frequency with age, sex, posture, time of day, &c.

491. *Age and Sex.*—Quetelet has made some interesting observations on the respiration at different ages, in males and females. The following table presents the results which he obtained from about three hundred observations on the male, and a smaller number on the female :

AGE.	Number of the Respirations.	
	MALE.	FEMALE.
At birth	23 to 70	27 to 68
5 years	32	
15-20	16 to 24	19
20-25	14 to 24	17
25-30	15 to 21	
30-50	11 to 23	19

The range of my own respiration from my twenty-eighth to my thirtieth year, as founded upon numerous experiments, was 12 to 22.

492. *Posture.*—The results of a large number of observations, made by the self-registering instrument already referred to, were as follows : For a pulse of 64 the respirations were, standing, 22 ; sitting, 19 ; and lying, 13. Hence the rule which the pulse follows, viz., that the difference between standing and sitting is greater than that between sitting and lying, is inverted in the case of the respiration. The respiration in the sitting posture ranged from 15 to 21.

493. *Period of the Day.*—The rule of the pulse is also inverted in respect to the influence of the time of the day ; for whereas the pulse becomes less frequent as the day advances, the respiration increases in frequency. On comparing the same frequency of pulse morning and evening, I find that there are about 18 respirations in the evening for 17 in the morning. The same rule obtains in disease in both sexes, even in those cases where the pulse becomes more frequent in the evening. That degree of debility, therefore, which fatigue occasions both in health and disease, is accompanied by increased frequency of respiration.

494. *Sleep.*—Quetelet has examined the effect of sleep on the respiration. In a woman in her twenty-seventh year he found the respiration to be, awake, 27 ; asleep, 21. In two young children the differences were 5 and 8 respectively. It

appears from his experiments that the respiration is more affected by sleep than the pulse.

495. The other causes which in health affect the frequency of the pulse, produce the same, or a similar effect on the respiration. Thus, all causes which increase the frequency of the pulse and the force of the circulation, augment the number of the respirations. On the other hand, all causes of diminished frequency of pulse also lower the respiration. Thus, exercise increases the number of respirations, rest diminishes them: high temperatures increase the frequency both of the pulse and breathing, cold diminishes the frequency of both. Sleep, which lowers the pulse, has a still more marked effect upon the respiration. The only exception to the rule with which I am acquainted is that of debility. It has been already stated that debility without disease, provided it be not extreme, is accompanied by an infrequent pulse; the number of respirations, on the contrary, is increased in every degree of debility.

496. *Proportion which the Respiration bears to the Pulse.*—This has been variously estimated by authors. Quetelet, Burdach, and the majority of physiologists, estimate the number at 1 to 4; Joy (*Lib. Pr. Med.*) at 1 to $4\frac{1}{2}$; Floyer at 1 to 5. No dependence can be placed on any of these estimates, as they were formed in ignorance of the effect of posture on the breathing. In my own experiments, the proportion has varied between 1 to 2.60 and 1 to 5.23. The chief cause of this difference is the posture of the body. Thus, for a pulse of 64, the proportion standing was 1 to 2.95; sitting, 1 to 3.35; and lying, 1 to 4.97. In the sitting posture, but for different frequencies of the pulse, it has varied from 1 to 2.61 to 1 to 5.00. The proportions morning and evening for the same frequency of the pulse are about 1 to 3.60 and 1 to 3.40. The proportion which the respiration bears to the pulse decreases as the pulse increases. Thus, for a pulse of 54, the proportion was 1 to 3; for a pulse of 72, it was 1 to 4. As a general rule, the number of respirations increases with that of the pulse, but in a less rapid ratio, the proportion which the respiration bears to the pulse decreasing as the pulse increases. Further observations may slightly modify these and other statements, founded upon my own observations, but they will be found in the main correct.

497. In disease, the number of the respirations varies within much wider limits than that of the pulse. The smallest number which I have counted is 6 in a female sleeping, but not comatose, after attempting suicide by laudanum; and I have counted as few as 10 respirations in a case of paralysis. On the other hand, I have reckoned as many as 44 in a case

of phthisis, 73 in a case of paralysis agitans, and 140 in a case of hysteric asthma. Floyer met with 60 respirations in a case of suffocative catarrh, and in a case of inflammation of the lungs in a child: on the other hand, he counted as few as 7 in more than one attack of asthma. Dr. Graves has recorded as small a number as 12, and as many as 50, in cases of fever.

498. With regard to the proportion which the respiration bears to the pulse in disease, Floyer has found it as high as 1 to 2 in a case of suffocative catarrh, and as low as 1 to 14 in a case of asthma; Dr. Graves has observed as high a proportion as 1 to 2 in one case of fever, and as low a proportion as 1 to 20 in another. In the case of paralysis agitans already referred to, I counted a pulse of 72 and 73 respirations; in the case of hysteric asthma, 144 pulses and 140 respirations; in a case of transposition of the heart, 32 respirations to 46 pulses; and in a case of paralysis, 1 respiration to $6\frac{1}{2}$ pulses. In a case of aneurism of the heart reported by Mr. Peacock (*Prov. Med. Jour.*, No. 4, vol. ii.), there were 34 respirations to 33 pulses.

499. These remarkable variations in the number of the respirations as compared with that of the pulse are readily explained, if we reflect that the respiration is influenced by many other causes besides the quantity of blood sent to the lungs by the heart. Some of these causes are internal and some external. The principal internal causes are the state of the lungs themselves, and of the pleuræ by which they are invested. Among external causes are mechanical obstructions to the entrance of air, as by the pressure of tumors upon the air-passages, constriction of the chest, increased or diminished action of the muscles of respiration, &c. All these obstructions to the free play of the lungs, and the due performance of respiration, accelerate the breathing; and this acceleration, whether accompanied by a feeling of uneasiness or not, has been called dyspnœa. As this is the principal symptom of all diseases of the lungs, and a concomitant of a great majority of the diseases of the heart, it will be useful to present the chief causes of it in a tabular form.*

CAUSES OF INCREASED FREQUENCY OF RESPIRATION.—DYSPNŒA.

I. *Quantity of Blood in the Lungs increased.*

- | | |
|--|---|
| a. With quickened circulation. | { Exercise, repletion, plethora
(1st degree), inflammatory fevers,
hypertrophy of the right side of
the heart, &c. |
| b. With obstacle to the return of
blood to the heart. | { Diseases of the mitral valve,
pressure on the pulmonary veins,
&c. |

A similar table is given by Dr. Williams in *Lib. Pr. Med.*, vol. iii., p. 25. Some use has been made of it in forming this scheme.

II. *Quality of the Blood altered.*

- a. More venous than usual. { Morbus caruleus, &c.
 b. Red particles deficient. { Anæmia, chlorosis.

III. *Deficiency of Oxygen in inspired Air.*

- a. Air pure, but small in quantity. { Air rarefied by high temperature, or diminished atmospheric pressure.
 b. Air defective in quality. { Non-poisonous gases, as nitrogen and hydrogen.

IV. *Mechanical Obstructions.*

- | | | | | |
|-----------|---|-------------------------------------|---|--|
| Internal. | { | a. Of the air-tubes. | { | Diminished size of air-tubes, from thickening of their parietes, or from pressure, and accumulations of mucus, as in the death-struggle. |
| | | b. In lungs themselves. | | Congestion, hepatization, œdema, tubercle, &c.; emphysema, dilated bronchi, vomicae, &c. |
| | | c. In pleural sac. | | Hydrothorax, pneumothorax, pleuritic effusions and adhesions. |
| | | d. Caused by other internal organs. | | Enlargement of the heart or large vessels, aneurismal tumors. |
| External. | { | a. In parietes of the chest. | { | Malformations and distortions, ossification of cartilages, &c. |
| | | b. In abdomen. | | Enlarged viscera, tumors or dropsical effusions. |

V. *State of the Muscles of Respiration.*

- a. Paralysis (partial). { Injuries of the spinal marrow, in the neck, &c.
 b. Debility. { From fatigue, exhaustion, after severe febrile affections, and at the approach of death.
 c. Pain, { 1. In muscles. { In intercostals, diaphragm, or abdominal muscles, the sound muscles performing the respiratory movements.
 { 2. In surrounding parts. { Pain in abdomen in peritonitis, and in the chest in pleuritis, the muscles which cause the least pain acting alone.
 d. Spasm. { Tetanus, hydrophobia, &c.
 e. Other forms of augmented innervation. { Strong mental emotions, hysteria, asthma.

501. The chief causes of diminished frequency of the respiration are sleep and coma, however produced, whether by narcotics or by pressure on the brain. The respiration, therefore, is infrequent in apoplexy, and in poisoning by opium and carbonic acid.

502. Many other characters of the respiration, besides increased frequency, merit attention; as the full or deep, the small or feeble, the regular or irregular; the short, quick, and catching; the long, the laboring; the thoracic, the abdominal, the diaphragmatic, &c.

503. Increased or diminished frequency of the respiration,

taken alone, is of comparatively little value ; it is only when combined with observations on the pulse, or examinations of the chest by percussion and auscultation, that we learn its real signification. Thus, a frequent respiration, taken alone, may arise from any one of the many causes specified in the table ; but a frequent respiration with an infrequent pulse, in the ascertained absence of any disease of the internal organs of the chest, would strongly indicate great debility, or, in the absence of this, hysteria. On the other hand, an infrequent pulse and respiration combined would as probably arise from some disease or injury of the brain or of the upper portion of the spinal marrow. Again, a frequent and quick respiration, in the absence of disease of the internal organs of the chest, and accompanied by acute pain of the parietes of the chest or abdomen, is at once explained by the existence of that pain, whether its seat be in the muscles or in the peritoneum.

504. Important indications may also be obtained by noting the number of the respirations day by day in acute diseases. In pneumonia, for instance, a daily diminution in the number of the respirations, with or without a similar change of the pulse, gives the best hope of recovery ; in apoplexy or in narcotic poisoning, on the contrary, an increase in the number of respirations, especially if accompanied by an increased frequency of pulse, may be considered as a good symptom. So in convalescence from fever, where there is great debility, a diminished frequency of respiration, with a gradual increase in the number of the pulse, is a sign of returning strength.

505. In making use of these, as well as of the less important symptoms and signs of disease, the observer should always be on his guard against the common error of trusting too implicitly to any one sign, however valuable in itself, to the neglect of others which are capable of affording him useful information. In the case of the diseases of the chest, for instance, neither the stethoscopic signs, nor the respiration, nor the pulse alone, can furnish the practitioner with all the information which he is in want of ; but if, knowing the exact value of each of these signs, and the fallacies which attach to each, he makes use of all of them at the same time, there are few difficulties in diagnosis which he will not be able to overcome.

CHAPTER IV.

OUTLINE OF GENERAL THERAPEUTICS.

506. THE science of therapeutics, as the name implies, treats of the cure and palliation of diseases. In its widest

sense, it comprises all knowledge which has an immediate bearing upon this important object—the knowledge of disease on the one hand, and of the virtues of remedies on the other. The application of this knowledge in individual cases constitutes the *art* of healing. As there is a general and special pathology, so is there a general and special therapeutics. General pathology has been treated in a former chapter; general therapeutics remains to be considered in the present.

507. This subject is beset by the same difficulties which attach to the study of disease, and by others which are peculiar to itself. It has been already stated, that our knowledge of disease is rendered imperfect by our ignorance of the phenomena of health: just in the same manner our knowledge of the action of remedies in disease is impeded by the slender information which we possess on the effects of those remedies on the healthy frame. But the great obstacle to the improvement of the science and the art of healing is the difficulty of instituting comparative trials of the efficacy of different modes of treatment in the same disease, and our necessary ignorance of the extent to which the body, if left to itself, would repair the injuries which it sustains. The medical man does not feel justified in leaving disease to itself; hence he is ignorant of the nature and power of the “*vis medicatrix* :” on the other hand, he is unwilling to risk the employment of a new remedy in a disease in which an old one has been used by general consent, lest an unsuccessful or fatal result should be laid to his charge.

508. When these facts are taken into consideration, it will be easy to estimate the difficulty of forming any exact classification of remedies, or establishing any broad principles of treatment. Nevertheless, it is important that the attempt should be made, as general principles are the foundation of all sound practice. The difficulties which lie in the way of such an attempt will be best removed by following step by step the principal functions of the body, as already described in a former chapter, and endeavoring to show the effect which remedies produce upon each of them in turn. In pursuance of this plan, the following arrangement will be adopted.

509. (1) Remedies applicable to disorders of the *primæ viæ*, including the treatment of disorders of the stomach, liver, and intestines. This part corresponds with the first division of Chapter II. (sec. 75–98).

(2) Remedies which affect the circulation and the functions performed by the several orders of vessels. This division corresponds with the second part of Chapter II. (sec. 155–205).

(3) Remedies which act upon the structures of the body.

This division corresponds with the third part of Chapter II. (sec. 206-214).

(4) Remedies which act upon the nervous system. This division corresponds with the fourth part of Chapter II. (sec. 215-303).

(5) A fifth division will comprise an attempt at a classification of the more important remedies, with some useful tables.

1. REMEDIES APPLICABLE TO DISEASES OF THE PRIMÆ VIÆ.

510. *Diet*.—Most disorders of the stomach require some regulation of the diet, or some directions as to the time and mode of taking food. The functional disorder of most frequent occurrence is anorexia, or loss of appetite, attendant upon almost all severe diseases, especially those of an inflammatory or febrile character. This loss of appetite, which is always accompanied by a loss of power to digest food, indicates either entire abstinence, or the use of such articles of diet as are least irritating to the stomach. These are the farinaceous liquids, such as barley-water and gruel; acidulated drinks, such as lemonade, imperial, toast-water, and the ripe juicy fruits, especially the orange. Some small portion of nutritious matter is furnished by these articles of diet, though the stomach has lost the power of digestion.

511. Those functional disorders of the stomach which are independent of the general system, and originate within the organ itself, are termed dyspepsia, of which there are two kinds—the acute and the chronic. The acute form requires a similar diet to that which is indicated in the anorexia attendant upon constitutional diseases; a diet free from all matter which can irritate the tender membrane of the stomach, such as gruel, arrow-root, or sago, to the entire exclusion of all solid matter, whether animal or vegetable.

512. The chronic form of dyspepsia requires a close attention to the time and mode of taking food, the quantity and quality of the food itself, and the condition of the other functions of the body, especially those of the intestines. The treatment of this form of disease involves too much detail to allow of its being discussed in this place. The necessity of complete mastication, and of the use of a moderate quantity of liquid, and the mischief of over-repletion, of prolonged abstinence, and of the excessive use of condiments, are too obvious to require much comment.

513. Organic diseases of the stomach require the same abstinence from solid and irritating matters which has been insisted upon in the treatment of acute dyspepsia. But here it is important to administer such substances as nourish, at the

same time that they are free from irritating qualities ; such as strong broths, soups, and jellies.

514. Another point to be attended to in regulating the diet of patients is, to give them such food as is suitable to their age. This caution requires to be observed more especially in the diseases of children. The stomachs of children are easily disordered by food ill adapted to their years and strength ; hence solid food of all kinds is apt to disagree with very young children ; and the disorder of the stomach which it occasions lays the foundation for severe constitutional maladies. Here we must recur to the diet of the infant at the breast, substituting for the milk of the mother new milk from the cow, and administering it, if necessary, in small quantities, and at long intervals. This simple treatment is often attended with the best effects.

515. The disorders of the stomach which have been just described, affect chiefly, if not entirely, the *reducing* function of the organ. When the *converting* function is disordered, the diet must be regulated according to the nature of the existing disorder. In cases of diabetes mellitus, for instance, where an unusual quantity of sugar is generated in the stomach and excreted by the kidney, such a diet must be prescribed as contains the smallest quantity of substances capable of being converted into saccharine matter. The saccharine staminal principles, therefore, must be given in small quantity and in an organized form, and the diet must consist chiefly of albuminous and oleaginous elements. A similar, but a less strict, attention to diet is necessary in the subjects of the oxalic diathesis, in whom it may be sufficient to prevent the use of sugar in its crystallized form.

516. A strict attention to diet is necessary not merely in disorders of the stomach, but as a means of inducing certain states of the general system. The influence which a particular diet exercises upon the health is well exemplified in the opposite systems of training practiced in preparing men for the exercises of the ring and of the turf. The physician, likewise, resorts to a certain kind of diet, with a view of imparting or reducing strength : allowing a nourishing diet to the convalescent, and restricting the patient laboring under a severe inflammatory or febrile attack to substances containing little or no nutriment. This latter, which is called the *antiphlogistic* diet or regimen, must be more or less strict, according to the severity of the disease in which it is prescribed. In cases of the more severe kind, abstinence from food may be necessary, fluids being allowed according to the existing degree of thirst : in less severe and urgent cases, the patient may be restricted to vegetables, which have little effect on the circulation.

517. During the stage of convalescence from acute diseases, it is necessary to pass with caution from the abstinence of the strict antiphlogistic regimen to vegetable diet, from that to fish or light broths, and then to meat in moderate quantity, beginning with that most easy of digestion, viz., mutton. The regulation of the diet in causes of convalescence is of much importance, and requires a strict attention, on the one hand, to the powers of the stomach, as tested by the degree of appetite, and the effect of the food already prescribed, and, on the other, to the state of the circulation, as evinced by the pulse.

518. The physician should bear in mind that vegetable food has little or no effect on the circulation, but that animal food stimulates, that warm liquids excite, while cold liquids act as sedatives, and that food produces its greatest effect on the circulation in the early part of the day. The knowledge of these facts should be acted on, especially in cases of slow and unsteady convalescence; that is to say, in those cases where debility is accompanied by some remains of local affection, where the appetite is variable, and that condition of the general system exists to which the name irritation has been given. On the other hand, when disease has entirely left the patient, and nothing but debility remains, when the appetite is strong and the circulation tranquil, food may be administered with less caution.

519. But there are cases in which a nourishing and even stimulating diet is necessary, though local inflammation and constitutional irritation be present. These are cases in which debilitating discharges exist, or extensive injuries are in course of reparation, requiring a more abundant supply of nourishment than that which the stomach, if left to itself and guided by the existing appetite for food, would be able to supply. Here we must combine the stronger and more stimulating kinds of solid food with liquids containing nourishment and stimulus, as wine, ale, porter, &c. In such cases, too, the previous habits of the patient must be attended to, and the drunkard must be supplied with his accustomed stimulus. These cases fall, for the most part, under the care of the surgeon, and it is in the treatment of them that the accomplished surgeon best displays his skill.

520. One general rule applies to diet, as to the employment of every remedy of the more simple kind, viz., that where diet is equally efficacious with medicine, it should always have the preference. The duty of the physician is not to cure disease by physic, but to cure it by all the means which are within his reach, and the more simple the means, the stronger their claim upon his notice.

521. Diet forms but a part of the remedial means which we have at command in treating diseases of the stomach. For the acute affections of the mucous membrane of the stomach, indeed, diet alone will often prove a sufficient remedy ; but for those chronic affections which have received the name of chronic dyspepsia, something more is required. In addition to the regulation of the diet, medicines are often required for the relief or cure of these cases. Much may be done by taking off the load from a weak stomach ; but it is necessary, at the same time, to impart strength.

522. Many substances, which have the effect of increasing the appetite and the powers of the stomach, are in common use, as condiments. Of these, common salt is the only one absolutely required ; for experiment has shown that animals deprived of this simple condiment soon perish, however nourishing their food may be in other respects ; and one of the severest punishments to which man has ever been subjected, is a diet from which common salt is excluded. With this exception, the healthy stomach does not stand in absolute need of condiments, though, when the diet consists principally of vegetable food, the use of spices seems to contribute to digestion.

523. Almost every substance which possesses active properties of any kind, when taken into the stomach, produces some effect upon the mucous membrane, and by far the majority increase its vascularity, the flow of its secretion, and the contraction of its muscular coat. All the rubefacients, for instance, that is to say, all those substances which inflame the skin, inflame the mucous membrane of the stomach also ; and many substances which have not power enough to act upon the skin, through the cuticle, affect the more delicate and less protected mucous membrane of the stomach. In small doses, these substances increase the appetite and strengthen the digestion ; when long continued, they produce congestion and debility of the capillaries ; and when given in large doses, they act as emetics. Thus, common salt, which in moderation is the best and safest condiment we possess, when given in large doses produces sickness, and in still larger ones acts as an irritant poison. The same observation applies to mustard, horseradish, garlic, &c.

524. There is reason to believe that, as far as the stomach itself is concerned, almost all substances, whether derived from the vegetable or mineral kingdom, act nearly in the same way. For instance, a quarter of a grain of arsenic, or a grain of tartar-emetic, or a scruple of sulphate of zinc, or the same dose of ipecacuanha, will not produce vomiting more effectually than a table-spoonful of mustard, or twice

the quantity of common salt, or a large draught of hot water. On the other hand, a thirtieth of a grain of arsenic, or the twelfth of a grain of tartar-emetic, or one or two grains of zinc, or the same dose of ipecacuanha or squill, will as surely increase the appetite as half a tea-spoonful of salt or mustard, or a small draught of warm water. In choosing, then, between the many substances which act as emetics in large doses, and as gentle stimulants in small ones, we prefer those which produce the least injurious effects upon the constitution; and these are the substances which experience has pointed out as the best and safest condiments. A list of them would comprise all the stimulant and aromatic herbs used in cookery, as well as many substances employed in medicine. All of these, under different names and variously combined, have been given either as independent remedies in dyspepsia, or to qualify remedies directed to other organs. Thus we combine mint, or ginger, or cloves with saline purgatives, ammoniacum with squills, galbanum with aloes, the essential oils with many different kinds of aperient pills.

525. The simple bitters, and the warm aromatic bitters, or the astringent bitters, under the name of aromatics, stomachics, carminatives, or cordials, are the remedies most frequently employed with a view of increasing the appetite, or causing the muscular fibres of the stomach to contract.

526. *Emetics*.—Any of the remedies just enumerated, when given in large doses, are emetics. Those in most common use are ipecacuanha, tartar-emetic, and zinc; mustard or common salt are often of use, on an emergency, when other emetics are not at hand. It is usual to promote the action of these substances by copious draughts of warm water, and by tickling the throat with a feather. Emetics are commonly prescribed merely with a view of emptying the stomach; occasionally they are used for this purpose in the beginning of febrile affections, and they are administered frequently, and at short intervals, with the best effect, in incipient cases of phthisis pulmonalis, and in bronchitis accompanied with profuse expectoration.

527. The stomach becomes insensible to the effect of stimulants if they are often repeated; so that what was an emetic at first, becomes a promoter of digestion; what acted as a gentle stimulant when first administered, loses its effect entirely by repetition. Thus, a cigar, to a person unaccustomed to smoke, will cause vomiting; but, after many repetitions, it becomes an effectual promoter of digestion. The same thing occurs in disease during the administration of tartar-emetic: the first few doses will often cause sickness; but ere long the stomach becomes accustomed to its use, and, if continued, it

produces that amount of stimulation which is favorable to digestion.

528. The remedies which have been mentioned probably differ but little in their mode of action on the stomach ; but their remote action on other organs of the body is very various. Some of them belong to the class of stimulants, others to that of tonics, and the most active are strong irritant poisons. It is in their direct action on the stomach itself that they resemble each other, producing, according to the dose, the effect of a stomachic, a nauseant, an emetic, or an irritant poison.

529. All the medicines which have been enumerated produce, according to their dose, a determination of blood to the mucous membrane ; and there are probably but few which produce permanent contraction of the capillaries. Cold liquids and ice are the most effectual remedies of this sort, and are, therefore, well adapted to combat severe inflammation of the stomach, or active hæmorrhage from the mucous surface. In the more chronic forms of determination of blood, and in passive hæmorrhage, nitrate of potash may be administered with advantage.

530. The muscular coat of the stomach may be stimulated to contraction most effectually by the warm aromatic bitters, as ginger, cardamoms, &c. ; the neuralgic pain of the stomach (gastrodynia) is often effectually removed by bismuth, zine, or nitrate of silver ; and the troublesome sickness which sometimes attends diseases of remote organs, by the hydrocyanic acid.

531. *The Liver*.—The functional disorders of the *liver*, which consist in a diminished secretion of bile, are most effectually treated by small doses of mercury, or by the nitro-muriatic acid. Another remedy sometimes given, with the same object of promoting the secretion of the bile, is taraxacum.

532. *Intestinal Canal*.—The chief functional disorders of the intestinal canal are diarrhœa, hæmorrhage, and constipation.

533. *Diarrhœa*, like dyspepsia, may be acute or chronic. Acute and recent diarrhœa, like acute gastritis, may always be removed by a farinaceous diet, from which all solid and irritating matters are excluded. Chronic diarrhœa, arising, as it does, from a congested state of the mucous membrane, may be cured most effectually by removing that congestion. This is effected by small doses of mercurial preparations, which, acting on the liver, increase the secretion of the bile, and unload the branches of the vena portæ. Where this treatment fails, which it rarely does, and probably only where the mucous membrane is in an extremely relaxed state, astringents may be resorted to, as catechu, kino, aromatic confection,

chalk mixture, tannin, &c. When these fail, the stronger astringent minerals, as sulphate of zinc or sulphate of copper, in combination with opium, will sometimes prove successful. In my own experience, the nitrate of potash has succeeded where these have failed.

534. Hæmorrhage from the intestines (*melæna*) requires the same treatment as chronic diarrhœa, viz., small doses of mercurial preparations, to increase the secretion of the liver and unload the *vena portæ*, combined with an unirritating diet. This treatment will be equally effectual whether the blood come, as some suppose, from the liver itself, or from the surface of the intestines. Another form of hæmorrhage from the bowels occurs in dysentery, and blood is also passed from internal or external piles. *Ipecacuanha* and opium have been found eminently serviceable in dysentery. Piles are most effectually relieved by unloading the bowels, by promoting the secretion of the liver, by the local abstraction of blood, and the local application of cold.

535. *Constipation*, as it arises from many causes, requires many remedies. The substances which naturally promote the action of the bowels are those which escape the action of the stomach, and are not convertible into nourishment; such as the green matter of vegetables, the hard covering of seeds, the tendons and gristle of meat. Where these are carefully removed in the process of cookery, constipation is apt to arise, and may often be removed by introducing some of these indigestible substances into the food. Thus, brown bread will often prove an effectual laxative.

536. The medicines which act upon the bowels are all those which cause vomiting when taken into the stomach, as tartar-emetic, tobacco, sulphate of zinc, *ippecacuanha*, squills, &c., and the whole class of irritant poisons. It is probable that all purgatives given in sufficiently large doses would act as emetics, just as all emetics given in too small doses to produce vomiting, when they pass into the bowels, act more or less energetically as purgatives. Many of those substances, however, which act as violent purgatives, have little or no effect on the stomach; hence their action may be considered as in some degree peculiar.

537. Purgatives act in two ways: by promoting the secretion of the mucous membrane, and by increasing the peristaltic action of the intestines; but some act slightly in one of these ways, and energetically in the other. Those which excite abundant watery discharges are called *hydragogue cathartics*.

538. Purgatives are of various kinds, and may be divided into groups or classes; as the mild cathartics or *laxatives* (*manna*, *cassia pulp*, *tamarinds*, *prunes*, *honey*, *bitartrate of*

potash, and the fixed oils, as castor, almond, and olive oils); the *saline* or antiphlogistic purgatives (sulphates of soda, potash, and magnesia); the milder acrid purgatives (senna, rhubarb, and aloes); the strong acrid purgatives (as jalap, scammony, black hellebore, gamboge, croton oil, colocynth, and elaterium); and, lastly, the mercurial purgatives (as the hydrargyrum c. cretâ, the pilula hydrargyri, and calomel).*

539. We make choice of one or other of these remedies, according to the object which we have in view. If we wish simply to relieve the bowels, we prefer combinations of aloes with rhubarb, or ipecacuanha; if gently to promote the secretion of the whole course of the intestinal canal, we use the gentle laxative; if to reduce inflammation, the saline; if to overcome obstinate constipation, the stronger purgatives; if to remove dropsical effusions, the drastic or hydragogue cathartics; and if we desire to promote the secretion of the liver at the same time, we combine the mercurial purgatives with those adapted to fulfil other indications.

540. The choice of purgatives is not more important, however, than the mode of administration. When the bowels have been long overloaded with fæces, and especially where the irritation produced by them has affected the nervous centers, it is important to remove the load from the intestines without increasing the mischief already existing; in other words, hypercatharsis must be carefully avoided. Here we must not only select such remedies as effectually remove the feculent matter, but watch their operation from day to day; and as soon as any signs of intestinal irritation make their appearance, we must withdraw our purgative, and treat the hypercatharsis as if it were diarrhœa produced by any other irritating cause, viz., by a mucilaginous diet.

541. In cases of extreme irritability of the stomach or bowels, or of both, we may relieve the intestines by enemata, consisting of warm water, or gruel with or without an admixture of common salt; or we may employ any of those remedies which act as purgatives, however introduced into the system. Of these, the most effectual is croton oil combined with castor oil, and rubbed into the skin. The shock of cold water on the surface of the abdomen, or the electric spark, will also produced a purgative effect; the former is often employed with advantage in cases of obstinate constipation.

2. MEDICINES WHICH ACT ON THE ORGANS OF CIRCULATION.

542. We recognize three distinct states of circulation in healthy persons, in disease, and under the operation of medicines, viz., 1. Increased frequency of pulse with increased

* See Pereira. Introduction.

force and fullness ; 2. Increased frequency of pulse with diminished force and fullness ; 3. Diminished frequency of pulse with increased or diminished force and fullness.

543. In health, the first state of circulation is brought about by violent exercise, by spirituous liquors, &c. ; the second may be produced by those strong mental emotions and impressions which, in excess, give rise to syncope ; the third attends exhaustion and sleep.

544. In disease, the first state of circulation is present in acute inflammation or high inflammatory fever ; the second in all diseases attended with extreme debility ; and the third in apoplexy.

545. The same conditions follow the operation of remedies ; the frequent, full, and strong pulse is produced by spirituous liquors, ammonia, &c. ; the frequent, small, and weak pulse by tartar-emetic, tobacco, &c. ; and the infrequent pulse, of varying size and force, by opium, conium, stramonium, &c.

546. In the cases specified, that is to say, in health, in disease, and under the operation of remedies, supposing the several states to be produced in the same person, with the same quantity of circulating fluid in his body, it is obvious that in a given time more blood will traverse each organ in the first case, a less quantity in the second case, and a variable quantity, sometimes more, sometimes less, in the third case.

547. According to the first supposition, the quantity of blood traversing each organ is increased in two ways : by the increased frequency of the heart's beat, and the increased quantity of blood sent out at each contraction of the ventricle ; according to the second supposition, the quantity of blood passing through each organ is diminished, because the quantity of blood sent out from the heart is lessened more than the number of beats is increased ; and, according to the third supposition, the heart sends out in one case more, in another less, blood than that which will compensate for the diminished number of its beats.

548. The remedies which augment the frequency as well as the force of the heart's contractions are called *stimulants* ; those which augment their frequency and diminish their force are called *depressants* ; those which produce diminished frequency belong to the class of *sedatives* and *narcotics*.

549. *Stimulants (incitants or excitants)*.—According to the definition just given, the state of the circulation is made the test and measure of the effect of remedies ; those remedies being stimulants which increase the frequency, as well as the force, of the heart's contractions. In assuming this as the test, it is not meant to apply it without any exception, for it

will soon appear that there are cases in which stimulants diminish instead of increase the number of the heart's contractions. Nevertheless, this is their invariable effect on healthy and vigorous persons, and their more common effect in disease.

550. This state of circulation is brought about by the agency of the nervous system, whatever may be the part to which the stimulant is applied; and this change thus produced in the condition of the nervous centres is reflected back upon the heart and organs of circulation. If, for instance, a stimulant, such as brandy, be taken into the stomach, the impression produced upon its nerves is conveyed, either directly to the heart through the branches of the solar plexus, or to the brain and spinal cord, whence it is reflected upon the heart; or, being absorbed into the circulation, it may be applied directly to the nervous centers, or to the nerves supplying the lining membrane of the heart itself. Here there are many possible ways in which the circulation may be affected; but a more simple case is that of exercise, the most powerful stimulant of the healthy frame. It may easily be proved that the effect of exercise on the circulation is not merely a mechanical one, but that it arises, at least in part, from the reflection of nervous influence upon the heart in common with the voluntary muscles of the body. The effect of heat applied to the skin is evidently due to the same cause. Hence it may be safely stated, that though the state of the circulation is the test of the action of stimulants, it is through the nervous system that that state is brought about.

551. The effects of stimulants on the healthy body may be partly explained by the increased quantity of blood sent to every organ of the frame. The rapid and abundant circulation through the lungs leads to a more frequent respiration and a more complete decarbonization of the blood; the increased flow of arterial blood to the brain excites all its functions; the impressions on the senses are more acute, the flow of ideas more rapid, volition stronger and more prompt, the passions excited, the feelings joyous; all the capillaries of the body are distended, and the glandular structures pour forth secretions; the involuntary muscles, too, partake of the general excitement; and the functions dependent upon them, as digestion, defæcation, &c., are performed with increased vigor.

552. Such are the effects of stimuli given in moderate quantity; in excess they act as depressants or narcotics. Thus, spirituous liquors, when taken in moderation, produce all the effects which have been described; but in large doses they may give rise either to sickness, accompanied by depression or collapse, or to narcotism. In the one case, they

occasion vomiting, a feeling of extreme debility, a frequent and small pulse, a cold sweat; in the other, they produce symptoms of apoplexy, oppression of all the functions, paralysis of the voluntary muscles, and an infrequent beat of the heart. The first effect is commonly produced in persons unused to the action of the stimulant, in whom the stomach, retaining its healthy sensibility to poison, rejects it when taken in large quantity; the latter, in those whose stomachs are naturally insensible, or have become so by long habit.

553. As the narcotic effects thus produced are similar to those brought on by opium, or by other substances belonging to the class of narcotics, alcohol has been put down in the list of narcotic remedies; but without sufficient reason, for narcotism is the necessary effect of extreme exhaustion of the nervous power, and exhaustion the invariable consequence of over-stimulation. It would be as reasonable to call exercise a narcotic, because the exhaustion which it produces, when carried to excess, occasions deep sleep. Alcohol has all the attributes of a pure stimulant, differing from other stimulants in degree more than in kind, and belonging to the class of volatile or diffusible stimulants. If alcohol is to be placed among the narcotics, because it may produce coma, it must be classed with the emetics and depressants, because it occasions sickness and debility. It may be laid down, then, as a general rule, that all stimuli carried to excess produce exhaustion of the nervous power, and that this exhaustion may display itself in one of two ways—in depression or oppression; in debility or coma.

554. It has been stated that increased frequency, fullness, and force of pulse is the test of the action of stimulants, but that there is one case in which the test does not apply. This case has already been indicated (sec. 260). It is the case of debility without local disease, and accompanied with frequent pulse: in this state stimulants diminish the frequency of the pulse. It was also stated, in the same place, that the effect of stimulants on a pulse rendered infrequent by debility without local disease was much less than that produced on the pulse of healthy persons. This fact is easily explained, by the exhaustion of the nervous system which attends debility, and renders it dead to all impressions from within or from without. In administering stimulants in this state of debility, their effect on the circulation should be carefully noted. If they lower the pulse, they act favorably; if they raise it much, they do harm. It is when they lower the pulse that stimulants act as tonics; when they raise it much, they impart merely momentary strength, to be followed by collapse proportioned to the previous excitement.

555. *Tonics*.—These remedies, as the name implies, are given in states of debility, with a view of restoring firmness, strength, and *tone* to the entire frame. When the body is extremely weak, stimulants have the effect of imparting real strength; in other words, they become tonics. In less degrees of debility, they produce less obvious effect than on the robust and healthy. Stimulants in large doses become tonics in small ones; is there not, therefore, good reason to suppose, that those remedies which are tonics in the dose in which they are commonly employed, would act as stimulants in larger quantities? Ought not stimulants and tonics to be classed together, as remedies which have the same effect on the system, but vary rather in the state of body in which they are administered, stimulants being tonics for the weak, and tonics becoming stimulants to the strong?

556. *Depressants*.—This name is here used to distinguish a class of remedies which has the effect of rendering the pulse frequent, small, and weak—the exact reverse, therefore, of the action of stimulants. This change in the circulation is accompanied by great prostration of strength, nausea, cold sweat, and all those symptoms which characterize approaching syncope. It is brought about by the abstraction of blood, by the preparations of antimony, and by many remedies which act as stomachics in small doses, and as emetics in large ones.

557. The loss of a large quantity of blood, or the rapid removal of a smaller quantity, brings about syncope, or a state approaching to it, and as during this state the heart sends out a comparatively small quantity of blood, and that which it does send forth is propelled with little force, that part of inflammation which consists of an increased action of the heart is removed by this simple depressant.

558. Tartar-emetic, which, next to bleeding, is the sheet-anchor in acute inflammation, and one of the most powerful and safe remedies in the materia medica, brings about precisely the same condition as that produced by bleeding, and may be employed either alone or in combination with blood-letting in the treatment of all *acute* inflammations. Tartar-emetic is the only depressant of acknowledged power and efficacy which acts simply as a depressant; for tobacco, which produces a very similar effect in some respects, combines the properties of a narcotic and a depressant.

559. As there is an exception to the rule that stimulants increase the frequency and force of the pulse, so is there an exception to the rule that depressants increase its frequency while they diminish its force. Thus, blood-letting, which belongs to the order of depressants, will render the pulse full and strong, and even increase its frequency, in certain cases

of plethora, when the circulation is oppressed with blood, and in pneumonia, when the powers of the system are oppressed and the circulation impeded by obstruction to the important function of respiration. Again, in cases of acute inflammation, accompanied with high inflammatory fever, bleeding or tartar-emetic will lessen the frequency and force of the pulse at the same time. In all these cases, however, the *modus operandi* of these remedies is essentially the same. It appears to be different merely because the circumstances in which the remedies are employed vary. Bleeding is not a stimulant because it sometimes gives force and frequency to the pulse, any more than alcohol is a depressant because it sometimes renders the pulse small and frequent. The ordinary effect of remedies on persons in health ought to determine the class to which they shall be referred.

560. *Sedatives*.—These remedies may be considered in this place, because they are nearly allied, in some respects, to the last class, and are by many authors confounded with them. Like stimulants and depressants, they act upon the nervous centers originally, though some of their more obvious effects display themselves in the circulation.

561. Sedatives differ from stimulants and depressants, inasmuch as they do not increase the frequency of the pulse, but, on the contrary, diminish it. They resemble narcotics in reducing the frequency of the pulse, but differ from them in not producing stupor. The true sedatives sometimes produce sleep, but they as frequently occasion wakefulness; they differ from the pure narcotics inasmuch as in large doses they cause delirium, or a state nearly resembling delirium tremens, while the narcotics in large doses occasion coma and apoplexy.*

562. Hydrocyanic acid and digitalis are the principal remedies of this class, to which may be added the powerful remedy of cold. Hydrocyanic acid and digitalis both lower the pulse, although neither of them bears any resemblance, in other respects, to narcotics. It is true that there are states of system in which both these remedies will increase the frequency of the pulse, just as there are states of system in which the effect of stimulants and depressants on the circulation is reversed. Digitalis, for example, which, administered in diseases accompanied with a frequent pulse, lowers it in a remarkable degree, and often reduces it much below the healthy standard, in some healthy persons, and perhaps in all, has the reverse effect.† The effects of hydrocyanic acid are more constant;

* See some of the distinctions insisted upon in this place clearly laid down in Dr. Billing's "First Principles of Medicine," p. 77, et seq. Many of these views are also embodied in Dr. Spiller's "Manual of Therapeutics."

† See the experiments made by Dr. Saunders on his own person, and detailed in his work on Consumption.

but there is little doubt that exceptions exist to the rule of its operation. In classing cold with sedatives, the same difficulty exists, for extreme cold produces effects which give it as good a title to be placed among the narcotics. This remedy is so important that it deserves a separate consideration.

563. *Cold*, according to the degree and manner of its application, acts in very different ways. Its general effects on the circulation depend upon its intensity. A moderate degree of cold applied to the general surface acts as a stimulant; but when the skin is hot and dry, it reduces the temperature, lowers the circulation, soothes the nervous system, and disposes to sleep. Applied to the head in the form of cold lotion or of ice, it is one of the most valuable remedies in inflammatory affections of the brain. Its application to other parts of the body is of the greatest service in local inflammation or hæmorrhage. Cold is applied to the throat internally or externally in scarlatina anginosa, in the first stage of cynanche tonsillaris, and in hydrophobia, with the best effects. The effect of this powerful agent on the nervous system will be considered in another place. Applied locally in the form of *douche*, it restores the elasticity of the capillary vessels, and by preventing further effusion, allows the absorbent vessels to remove any fluid which may have been thrown out.

564. *Narcotics*.—The action of these remedies belongs so completely to the fourth head (the action of remedies on the nervous system), that nothing need be said in this place, except that the effect of narcotics on the circulating system is the opposite of that produced by stimulants and depressants, viz., that of diminishing the frequency of the heart's contractions. These remedies also affect the respirations in a striking manner, diminishing their number in a still greater degree than that of the pulse. This combined decrease of the pulse and respiration may serve to distinguish the action of this class of remedies; for all those remedies which produce great debility, as the depressants, for instance, increase the number of the respirations, though in certain cases they diminish that of the pulse. The double effect of narcotics on the pulse and respiration therefore deserves attention.

565. The remedies which have been examined affect the circulation primarily by the influence which they exert upon the nervous centers, and secondarily through the reflection of that influence upon the heart. It remains to speak of the means which we have of effecting changes in the capillary vessels.

566. *Remedies which affect the capillaries*: Treatment of inflammation. It has been already stated that in inflammation there is diminished action (that is, diminished contractility)

of the capillaries, with increased action of the heart, and that the two, together, keep up that dilated condition of the capillaries which is the essence of inflammation. It is obvious that there are two ways in which these minute vessels may be restored to their healthy degree of contraction: the first is by lessening the quantity of blood which passes through them, and the second by increasing their contractility. In most acute inflammations, both these remedies are required. If the inflammation be recent, the capillaries may recover themselves, if once relieved from the undue quantity of blood sent to them by the heart; and in this case the abstraction of blood, or the use of depressing remedies, will suffice; but if the inflammation be chronic, the capillaries may have so lost their contractility as not to recover themselves, though the blood circulates through them in diminished quantity; and in this case we must make use of such remedies as restore the lost contractility of the capillary vessels; and precisely the same treatment is required in that state to which we give the name of congestion.

567. The treatment of inflammation, then, is two-fold: it consists in diminishing the quantity of blood sent out by the heart on the one hand, and in restoring the lost contractility of the capillaries on the other. The first indication can be fulfilled only by general remedies, the second by general or by local means.

568. As the increased action of the heart occurs only in the *acute* form of inflammation, it is in that form alone that general remedies are necessary. These remedies are general blood-letting and depressants, of which the best is tartar-emetic. Take, for example, an acute case of pleurisy, occurring in a robust man, or in one previously enjoying good health, the treatment is very simple: bleeding to the approach of fainting, or the complete cessation of pain, followed, without loss of time, by tartar-emetic, in such doses and at such intervals as to keep up a constant state of nausea.

569. This is the way to save blood and to avoid chronic disease. Bleeding alone, even though often repeated, will not suffice to subdue the inflammation, for each bleeding is followed by reaction, and that reaction re-establishes the inflammation.

570. The great principle to be observed in the treatment of all acute inflammation is to subdue it at once, and not to allow reaction. If this principle is not strictly adhered to, chronic disease will be the consequence. M. Louis has taught us a useful lesson as to the inefficacy of mere bleeding in one disease (pneumonia). He found—as every man who knows anything of the treatment of disease would expect—that

bleeding, mere bleeding, shortened the duration of the disease only by one day. Of course it did. How was any other result to be expected! The word *reaction* explains it all. We must never, then, allow reaction. We must subdue inflammation at once, and keep it down till the capillaries have had time to contract to their usual size. If tartar-emetic should fail to subdue the inflammation after one bleeding, which it may possibly do in very plethoric persons, another bleeding must be resorted to, for it is always better to risk temporary debility than chronic disease.

571. In the abstraction of blood, one rule should always be borne in mind—to spare the lancet where we can, but to use it boldly where other means fail us.

572. Such is the treatment of acute inflammation where it is accompanied by strong action of the heart. But this is not present in all cases of inflammation. It is absent in inflammation of the mucous membranes, unless they take on the most acute character, as in croup, or in cases of irritant poisoning; it is absent also in erysipelas, and in many cases of inflammation occurring in persons of a broken constitution. The chief inflammatory diseases which affect the general circulation are those of the serous membranes, acute rheumatism, and extensive inflammation of the cellular membrane, the consequence of injury.

573. When inflammation of the mucous membranes, however, occurs in its most severe form, general depletion is necessary, especially if the affected membrane line some narrow passage, which is apt to be filled with the secretion poured out from its surface. Thus we bleed in croup, partly on account of the existing inflammation, and partly because the narrow passages of the larynx and bronchia are apt to be filled up by the tenacious secretion poured out from the surface of the membrane. In pneumonia, too, we use the lancet freely, for a similar reason; not merely to subdue the inflammation, but to prevent the functions of the lungs being entirely suspended by the arrest of the blood in the air-cells.

574. There is another case in which we are obliged to employ general remedies, though the existing inflammation does not materially affect the circulation or threaten life, viz., when the part affected by the inflammation is an organ of such extreme delicacy that the continuance of inflammation in it would destroy its functions. This is the case in inflammation of the internal parts of the eye, when the most active measures are necessary to save the organ from destruction.

575. As a general rule, then, it may be stated, that blood-letting is required when inflammation is accompanied by increased action of the heart, or when some function essential

to life is impeded, or some delicate organ threatened with destruction. In most other cases, general bleeding will be unnecessary.

576. The second indication—that of causing the dilated capillaries to contract on their contents—may be accomplished in various ways; locally, by pressure, cold, astringent applications, and the cautious use of substances which themselves cause inflammation, but act as gentle stimulants when applied in small quantity and for a short period; and generally, by remedies which experience has shown to possess that property.

577. If the vessels are much distended with blood, local depletion is indicated as a preparatory measure. When the capillaries have been by this means partially emptied of their contents, we may apply the remedies just mentioned according to the nature of the inflamed part. Pressure, properly applied, lends support to the vessels, and gives them time to contract; cold acts on all the textures of the part, on the capillaries as well as on the nerves which supply them; astringent applications cause all the textures to contract, at the same time that they gently irritate the vessels and excite them to the performance of their proper function; while the direct irritants, as nitrate of silver, and the sulphate of zinc and copper, prove beneficial simply by their stimulating property.

578. All these applications have been used with advantage: pressure, in chronic inflammation and ulceration of the extremities, in swelled testicle, &c.; cold, in every form of external and internal inflammation, as in common phlegmonous inflammation of the skin, in the inflammatory sore throat of scarlatina maligna, in the inflammation of the fauces attending hydrophobia, in inflammatory diseases of the rectum and vagina, &c.; astringents, in common or specific inflammation of the mucous membranes; stimulants, in phlegmonous inflammation of the skin, to the surface of irritable ulcers, to the mucous membranes in the form of injection, &c.

579. The general remedies which promote the contraction of the capillaries (that is to say, remedies which act through the system and not by local application) are the metals, especially tartar-emetic, mercury, arsenic, and iodine, which act on the capillaries of every part of the body; and certain local remedies which affect particular organs, as uva ursi, copaiba, cubebs, pepper, &c.

580. The first class of remedies (tartar-emetic, mercury, arsenic, and iodine), when applied to the skin, excite inflammation; this shows the power which they exercise over the capillaries: they are also capable of being absorbed and taken into the circulation, and, consequently, they are applied to the capillaries in the most direct manner. Hence, when admin-

istered internally, they may be presumed to have the same power of curing inflammation which nitrate of silver has when locally applied.

581. The cases in which one of these remedies is more applicable than another are found out empirically. Tartar-emetic is to be preferred in common inflammation, mercury and iodine in specific inflammation. Mercury has the preference over all other remedies in cases of great urgency, when no time is to be lost, and our object is not merely to subdue existing inflammation, but to suspend specific disease, of which it is a part. Hence the use of mercury in iritis, croup, &c.

582. Uva ursi, copaiba, cubeba, and black pepper, are all employed with great advantage in inflammation of the mucous membrane of the urinary passages. They act as direct stimulants through the urine, and, when given in sufficient doses, cure gonorrhœa, even in its acute stage. Uva ursi is used chiefly in inflammation of the mucous membrane of the bladder; copaiba and cubeba in gonorrhœa, in which disease pepper has been employed by Dr. Billing with equal advantage. Copaiba has also been advantageously employed in cases of bronchitis.

583. *Hæmorrhage* differs little from inflammation in the treatment which it requires. Active hæmorrhage demands the same remedies as acute inflammation, and passive hæmorrhage may be cured by the same means which are found useful in some forms of chronic inflammation, viz., astringent remedies, such as cold, the preparations of lead, tannin, &c.

584. The treatment of *febrile affections* is governed by the same general principles which preside over the treatment of inflammation. When they are free from the complication of local disease, and are attended by a frequent, full, and hard pulse, depressing remedies, as bleeding and tartar-emetic, separate or combined, are indicated; but in those cases where there is great prostration of strength, with a small and frequent pulse, tonics or stimulants, according to the degree of the existing debility, will be required. Local disease must be treated by general or local remedies, according to the powers of the system, with the general precaution that the strength of the patient must be husbanded as much as possible, in order that he may not be worn out before the disease has run its appointed course. The same remark applies with equal force to those febrile affections of which local inflammations form a constituent part, as the febrile exanthemata, measles, scarlatina, small pox, and erysipelas.

585. The process of *secretion* is one over which medicines exert much power either directly or indirectly. The most important secretions are those of the lungs, skin, and kidneys.

The secretions of the lungs not being subjects of observation or measurement at the bedside, yield in point of importance to the two latter.

586. The nature of the process of secretion, and of the influence which remedies have upon it, will be best understood by selecting the secretion of the skin as an example. When the skin is red, hot, and dry, we can excite perspiration by the cautious application of cold; when it is pale, cold, and dry, by the application of heat. In the one case we diminish the size of the capillaries, and consequently the quantity of blood which they contain; in the latter, we increase both. In the same conditions of skin, and in the same states of the system, we can produce the same results by depressants on the one hand, and by stimulants on the other. It appears, then, that in the case of this important secretion, we can produce the same effect by a local application, and by a remedy internally administered. In these cases of local application, the temperature of the skin which is favorable to sweating is intermediate between the two opposite conditions, accompanied by the dry skin. So, also, in the case of the general remedies, the temperature of the skin is brought to the same intermediate condition by the depressants on the one hand, and by the stimulants on the other. This state of the skin might be termed the "sweating point."

587. It is true that this point is not fixed, for it must vary in different persons, not only with the temperature of the skin and the quantity of blood circulating through the capillaries, but with the condition of the capillaries themselves; so that in strong and robust persons it must be, so to speak, much higher than in those worn out by disease; while in extreme debility it is well known that cold sweats take place from mere relaxation of the capillary vessels, when the temperature of the body is extremely low.

588. It appears, then, that increased secretion from the skin may be brought about by remedies which act upon the general circulation, and this fact may be extended by analogy to other secretions also. Thus, blood-letting, practiced in a case of inflammatory fever, will promote the flow of all the secretions, by bringing the capillaries of all the organs to what may be termed their secreting point.

589. In this place it is necessary to enter a protest against the anxiety often entertained by the practitioner to obtain diaphoresis. Sweating is, no doubt, a good sign and a useful thing whenever the skin is hot and dry; but as, in the administration of so-called diaphoretics, the sweating is the necessary consequence of the change which has been effected in the general circulation, our anxiety should be, not to procure

diaphoresis, but to bring the circulation into that state in which sweating is possible. Now this is not a mere splitting of straws, for by placing ourselves in the proper point of view, we are able to make a right selection of our diaphoretic. Thus, when the skin is hot and dry, we select a depressant; when cold, a stimulant diaphoretic. So, also, with diuretics; we select a stimulating diuretic in languid states of the circulation, and a depressing one where there is strong febrile action.

590. It is not meant to assert that all remedies which promote secretion act only through their influence on the general circulation, for the strong analogy which may be drawn from the local action of remedies on the capillaries in inflammation must admit of application to other states of those vessels; and as it is probable that secretion does not depend upon the mere size of the vessels and the quantity of blood circulating through them, but also on the condition of their coats, there is good ground for believing that some remedies act directly upon the capillaries themselves. The virtue of tartar-emetic may, perhaps, depend on the effect which it produces on the capillaries themselves, as well as on the general circulation, although in the majority of cases the latter explanation appears sufficient.

591. There is, indeed, one case in which the action of remedies in promoting secretion appears to depend almost exclusively upon the adaptation of the remedy to the quality of the secretion itself. For instance, the urine is a secretion which abounds in salts, and it is well known that saline medicines are of great efficacy in promoting that secretion: the perspiration, too, contains salts, though in less quantity; this secretion, therefore, like the urine, may perhaps be increased by the use of remedies of which salines form a part. Thus, Dover's powder may possibly derive part of its efficacy from the sulphate of potash which it contains.

592. Admitting, then, that the secretions may be promoted both by general remedies and by remedies acting locally on the capillaries of the secreting organ, it is important to distinguish the two cases, and to bear in mind that in disease affecting the general system, it is not so much our object to promote the flow of the secretions as to bring about that state of the circulation in which secretion takes place as a necessary consequence.

593. The remedies adapted to promote the *absorption* of fluids thrown out into the general cavities of the body, act, for the most part, through the general system. Of these the most powerful remedy is blood-letting, which acts by diminishing the quantity of the circulating fluid, and, when the cause of

dropsy is of an inflammatory nature, by removing the inflammation. The other remedies in common use are employed with the same views. They consist of medicines directed to the several secreting organs, especially the bowels, kidney, and skin. The increased secretion from these parts has the two-fold effect of blood-letting: that of diminishing the quantity of the circulating fluid, and subduing any inflammation which may exist.

594. Where much general debility is present, it may be necessary to combine tonics or stimulants (for stimulants are tonics to the debilitated) with depletion. To proportion the one to the other, much judgment and care are necessary.

595. The local means best adapted to promote absorption are those which stimulate the capillaries and parts affected, as friction with the hand or with stimulating liniments, a jet of cold water, the electric spark, tincture of iodine, &c. It is of little consequence to inquire whether these agents act by restoring the capillaries to their healthy state, or by stimulating the absorbents. (See § 202, and seq.)

3. REMEDIES ADAPTED TO THE REMOVAL OF THE SOLID STRUCTURES OF THE BODY.

596. Morbid growths have been divided (see § 209) into analogous and heterologous. Experience shows that we have little or no power over the latter class; they form one of the opprobria of medicine, and where they can not be removed by the knife, we can do nothing more than alleviate the sufferings which they occasion. The same observation extends to such analogous formations as do not consist in a mere hypertrophy of a natural texture.

597. Atrophy and hypertrophy, indeed, seem to be the only alterations of the solid structures of the body which are at all under the control of medicine. The remedies applicable to the restoration of a part from the condition of atrophy are, exercise, friction, electricity, and, in short, all those means which increase the flow of blood to the part and promote its natural actions. The remedies, on the other hand, which are of use in hypertrophy, are rest, pressure, cold, local abstraction of blood, preparations of mercury and iodine, &c.

598. The rationale of the action of the first-named remedies is obvious, but there is some difficulty in explaining the efficacy of mercury and iodine in promoting the absorption of solid textures. Are the capillaries contracted by these medicines so as to diminish the quantity of blood circulated through the part, and to a degree which is incompatible with secretion? or are the absorbents stimulated to increased activity? The former supposition appears the more probable, and is more in

conformity with what we know of the functions of the capillary vessels. The question, however, is of no immediate practical importance

4. REMEDIES WHICH ACT UPON THE NERVOUS SYSTEM.

599. As all the functions of the body are more or less dependent upon the nervous influence, it follows that all remedies possessed of active properties must affect the nervous system. All the medicines, therefore, which have already been mentioned under preceding sections, belong with equal right to this. Stimulants, depressants, sedatives, narcotics, and tonics, affect the circulation through the nerves; and even those remedies of which the action is strictly local, act locally on the nerves, and through them on the vessels to which they are distributed. But there are some substances which exert so peculiar an influence on the nervous system as to demand a separate notice in this place.

600. The remedies which act upon the *nerves of sensation* are classed by the toxicologist with narcotic or narcotico-acrid substances, but in works on materia medica they are considered as sedatives. Of these, monkshood and black hellebore, and their active principle, aconite, are the chief. They produce numbness, accompanied by a tingling sensation in the parts to which they are applied. Hydrocyanic acid also produces numbness of the part to which it is applied. Belladonna, too, acts locally on the nerves of sensation, and hence its efficacy in neuralgia. Its efficacy in dilating the pupil is perhaps due to its effect on the retina. But the best and most powerful remedy for this purpose is cold. It is more sure and manageable than any other, and, with proper precautions, may be applied whenever such remedies are indicated.

601. The *nerves of voluntary motion*, and, through them, the muscular system, are powerfully affected by remedies in three different ways: with paralysis, convulsions, and tonic spasms.

602. Extreme debility of the muscles is the familiar effect of all depressing remedies, and especially of tobacco. The same effect is produced by digitalis, and by hydrocyanic acid. Paralysis is produced by various poisons, as the woorara, ticunas, and curare, by large doses of conium and stramonium, and by one metallic poison—lead.

603. Convulsions are produced by almost all the narcotico-acrid and irritant poisons; and they follow poisoning by hydrocyanic acid, digitalis, squills, monkshood, black hellebore, conium, tobacco, stramonium, oxalic acid, &c., and occasionally occur in the course of poisoning with opium; they are also present in poisoning with arsenic, bismuth, copper, mercury, silver, and zinc.

604. Tetanic spasms are produced by *nux vomica*, *St. Ignatius's bean*, by *angustura*, *upas tieuté*, and the active principles *strychnia* and *brucia*. They are an occasional effect of monkshood, and of the ergot of rye, taken in poisonous doses.

605. The muscular contractions of the uterus produced by the *secale cornutum* furnish an example of local action on the muscular fibres, of which much advantage is taken in the practice of midwifery.

606. The treatment of diseases dependent upon, or accompanied by, local affections with reflex action of the muscles, is of much importance, and in this respect the theory of the excito-motory system is likely to confer great practical benefits on medical treatment. The importance of attending to the local affections in tetanus and hydrophobia, for instance, can scarcely be overrated. In the latter disease, ice, as a local application to the throat, internally and externally, has been attended with the best effects.*

607. The medicines which act upon the brain, and affect the peculiar functions of that organ, occasioning sleep, insensibility, coma, delirium, and erroneous perceptions, judgments, and volitions, are of great importance in the treatment of disease. The mode of action of the most important class, the narcotics, has already been examined (§ 564). It will be sufficient in this place to mention some of the more striking effects of the principal remedies in common use.

608. The class of inebriating substances, such as alcohol and spirituous liquors, ether, the nitrous oxide gas, and the resin of the Indian hemp, lately introduced to the notice of the profession by Dr. O'Shaughnessy, produce the effects of stimulants in small doses, the familiar phenomena of inebriation in larger ones, followed by sleep, stupefaction, or apoplexy: when long continued, they produce delirium tremens.

609. The *narcotics*, of which the principal are opium (*morpha*), henbane, and lactucarium, are employed to relieve pain, when they are called *anodynes*; or to soothe irritation, when they are termed *paregorics*; or to diminish inordinate muscular contraction, in which case they are called *antispasmodics*, or, lastly, to procure sleep, when they receive the name of *hypnotics*. Opium combines a stimulant with a narcotic principle; hence it is admirably adapted to the state of irritation, accompanied by much debility, the narcotic soothing the excitement, while the stimulant principle counteracts the existing debility. Sulphureted hydrogen, carbonic acid, carbonic oxide, and cyanogen gas, act also as narcotics. As such, carbonic acid has been locally applied.

* In a case admitted a few years since into the King's College Hospital, under the care of Dr. Todd.

610. The class of *sedatives* comprises many substances allied in some of their properties to the narcotics, and in others to the depressants. They differ from the narcotics in not producing sleep, but, on the contrary, delirium, in some of its many forms. Thus, belladonna, stramonium, monkshood, black hellebore, veratria, colchicum, and camphor, to which perhaps musk and valerian may be added, give rise to delirium in the first instance, which is sometimes followed, after a considerable interval, by coma. Tobacco, ipecacuanha, conium, squills, and digitalis, appear to produce coma without previous delirium. Tobacco, ipecacuanha, and squills, have been already described as depressants, and have been shown to have a remarkable effect on the muscular system.

611. Many of the metallic substances used in medicine appear to exert a peculiar influence on the nervous system. They are remedies which act locally as irritants, and when administered in small doses, and during a considerable period, as tonics: as such, they have been used with advantage in chorea and epilepsy. Arsenic, copper, iron, silver, and zinc belong to this class.

612. Cold has already been mentioned more than once as a remedy of great power. Its effects on the circulation have already been considered (§ 563). These are accompanied by a sedative effect on the nervous system. But cold produces marked effects on the nervous system, without any corresponding effect on the circulating organs. It blunts sensibility, and therefore subdues pain. Applied suddenly, it is an effective shock, and rouses both the body and mind. Hence the efficacy of cold water dashed in the face in hysteria, where all that is necessary to remove a paroxysm is strongly to excite attention and an effort at self-control; hence, also, its use in syncope and asphyxia. In the disorder of the nervous system which follows severe inflammatory diseases of the brain, it forms a most effective stimulus, rousing the nervous system, and gradually restoring all the functions of the organ. In cases of violent nervous excitement, on the other hand, it acts as a powerful sedative, allaying the irritation of the nervous system, and reducing the frequency of the pulse, subduing the most violent pain, and infallibly securing sleep. Such are its virtues in the violent paroxysms of mania.

5. CLASSIFICATION OF REMEDIES—TABLES OF DOSES, ETC.

613. The principal classes of remedies, with the more important substances contained in each class, have already been pointed out in the previous sections of this chapter. The following summary, which embodies these points of information, will be found of use, and in accordance with the design of a book of reference

614. CLASS I. STIMULANTS.—(a) *general*, (b) *local*. *General stimulants* excite all the organs and functions of the body: the circulation, the functions of the brain and nervous system, the secretions, &c. In healthy persons they cause a frequent, full, and quick pulse; in extreme debility, they render the pulse less frequent, but more full. The exhaustion which follows the excessive use of them resembles the effects of the depressants or narcotics.

615. *Local stimulants* act on one or more organs of the body, either directly or through the circulation. They excite those organs to the active performance of their appropriate functions, and this excitement is generally accompanied by increased determination of blood. The reaction which follows their abuse shows itself in sluggish function and circulation. In local debility they act as local tonics.

616. The *general* stimulants in most common use as medicines are the various forms and preparations of alcohol, ether, and ammonia, and cold employed as a shock. Among the stimulant remedies of less power are some of those which are commonly designated antispasmodics, as valerian, asa-fœtida, musk, &c. To these may be added serpentary and contrayerva, which appear to combine the virtues of a stimulant and tonic, and are employed with advantage in typhus fever.

617. There are certain remedies, also, which may be referred to the class of general stimulants, as they are administered by the mouth, enter the circulation, and affect particular systems and tissues. To this class belong nux vomica and the active principles strychnia and brucia, which affect the muscular system by producing tetanic spasms; the metallic preparations, especially mercury, arsenic, and antimony, which appear to act upon the entire capillary system, including the capillaries of the secretory organs; and the balsams which affect the mucous membranes.

618. The *local* stimulants comprise those which are applied directly to the body, as heat, the escharotics, and rubefacients, applied to the skin; the stomachics, carminatives, and emetics, taken into the stomach; the several classes of purgatives, applied to the mucous membrane of the bowels; and those which, after entering the circulation, act only on certain organs, as the sudorifics, the diuretics, the emmenagogues, &c.; and the stimulating remedies so advantageously employed in diseases of the urinary passages, viz., copaiba and cubeb. Some of these remedies have a specific action upon one part of the frame, as the ergot of rye, which stimulates the muscular fibres of the uterus; while others have a more extensive range of action, but affect one organ in a marked degree, as cantharides, which acts most strongly on the muscular coat of the bladder.

619. CLASS II. TONICS.—(a) *general*, (b) *local*. These are remedies which produce little or no sensible effect on the circulation, nor on the more obvious functions of the brain and nervous system. Their action is gradual, and consists, as the term implies, in giving tone and firmness to all the textures of the frame, by improving the state of the blood, or by increasing the contractility of the capillaries of every part of the body.

620. *General* tonics are either strong stimulants given in small doses, or weak stimulants in larger ones. As they are administered in states of debility, the characteristic effect of the stimulant on the circulation is not perceptible.

621. *Local* tonics are those remedies which restore the relaxed capillaries of parts to which they are applied to their healthy condition. These, too, are stimulants applied with caution, and of strength proportioned to the condition of the parts affected.

622. The principal *general* tonics are the stronger metallic preparations in small doses, or the less active, as zinc and steel, in larger quantities; the mineral acids, and a variety of vegetable substances, as myrrh, cascarilla, gentian, quassia, serpentary, cinchona, quina, &c. To these must be added, cold applied repeatedly in the form of shock, and followed by reaction. The *local* tonics are nitrate of silver, sulphate of copper, cold in the form of *douche*, &c.

623. CLASS III. DEPRESSANTS.—The action of depressants is the reverse of that of stimulants. They prostrate the powers and functions of the entire frame. They increase the frequency, but diminish the fullness and force of the heart's contractions, except where they remove an existing disease accompanied by a frequent, full, and hard pulse: in this case they render the pulse less frequent, smaller, and softer.

624. The best depressant which we possess, next to blood-letting, is tartar-emetic. The lobelia inflata belongs to the same class. Tobacco is still more powerful, but it is a narcotic as well as a depressant. Digitalis, ipecacuanha, squill, and colchicum possess this quality in a high degree, but with certain peculiarities of action.

625. CLASS IV. SEDATIVES.—(a) *general*, (b) *local*. This class comprises those remedies which soothe excitement of the nervous system, without producing a state approaching to syncope on the one hand, or that of narcotism on the other. They bear to depressants nearly the same relation that tonics do to stimulants. Local sedatives are remedies which blunt nervous sensibility, soothe pain, and allay spasmodic action of the muscular fibres.

626. Among *general* sedatives, cold is the most important. Belladonna, conium, and stramonium are of the same class.

The same substances locally applied are *local* sedatives. Nitrate of potash, trisnitrate of bismuth, the preparations of lead, and creosote, belong, also, to this class of *local* sedatives. Depressants in small doses become sedatives, as stimulants in small doses are tonics.

627. CLASS V. NARCOTICS.—The property of this class is to produce sleep, and, when given in poisonous doses, coma and apoplexy. Morphia is the type of this class, to which belong carbonic acid, carbonic oxyd, and sulphureted hydrogen gases, hyoscyamus, lactucarium, camphor (and hydrocyanic acid?). Opium and nutmeg combine a narcotic and stimulant property, while the hop is a narcotic and tonic.

628. In addition to the foregoing classes of remedies, there are other groups of less importance which require only a cursory mention; such are the emollients, the antacids, the antilithics, the anthelmintics, &c. The nature and mode of operation of the substances included in these groups are sufficiently obvious.

TABLE,

Showing the Doses for an Adult of some of the more active and important Remedies employed in the Treatment of Disease.

Acidum arseniosum . . .	gr. $\frac{1}{16}$ to gr. $\frac{1}{8}$.
Acidum hydrocyanicum dilutum . . .	} ℥iii. to ℥v.
Ammoniae sesquicarbonas . . .	
———— liquor . . .	gr. v. to gr. x. ℥v. to f3ss.
Antimonii potassio-tartras	{ gr. $\frac{1}{2}$ to gr. $\frac{1}{4}$ (sudorific). gr. $\frac{1}{4}$ to gr. i. (emetic.) gr. $\frac{1}{2}$ increased to gr. iv. (depressant.)
Argenti nitras . . .	
Belladonnae extractum . . .	
———— tinctura . . .	gr. $\frac{1}{8}$ increased to gr. iv. gr. i. “ gr. v. ℥ii. to ℥iv.
Brucia . . .	gr. $\frac{1}{2}$ increased to gr. v.
Colehici pulvis . . .	gr. i. “ gr. iv. or more.
———— tinctura . . .	℥xx. “ 3ii.
———— vinum . . .	℥xx. “ 3iss.
———— acetum . . .	℥xx. “ 3ii.
———— extractum . . .	gr. i. “ gr. iii. ℥ii. “ ℥xl.
Creosoton . . .	gr. $\frac{1}{2}$ to gr. ii.
Cupri sulphas . . .	gr. $\frac{1}{2}$ to gr. $\frac{1}{4}$.
Digitalis pulvis . . .	gr. $\frac{1}{2}$ to gr. $\frac{1}{4}$.
———— infusum . . .	3ss. increased to 3ss. or more.
———— tinctura . . .	℥x. “ 3i. or more.
———— extractum . . .	gr. i. “ gr. iii.
Elaterii extractum . . .	gr. $\frac{1}{16}$ to gr. $\frac{1}{2}$.

Ferri sulphas	gr. iii to gr. v.
Hydrargyri bichloridum	gr. $\frac{1}{16}$ to gr. $\frac{1}{8}$.
———— iodidum	gr. i. increased to gr. iv.
———— biniodidum	gr. $\frac{1}{16}$ “ gr. $\frac{1}{4}$.
———— bicianidum	gr. $\frac{1}{16}$ “ gr. $\frac{1}{2}$.
Iodinium	gr. $\frac{1}{2}$.
Lobelia inflata	gr. i. to gr. v.
Oleum crotonis	℥i. to ℥iii.
Plumbi acetas	gr. i. increased to gr. x. or more.
Potassæ liquor	℥x. to ℥j.
Potassii iodidum	gr. v. increased to gr. x. or more.
———— bromidum	gr. iv. “ gr. x.
Quinæ disulphas	gr. i. to gr. v.
Secale cornutum	℥i. to ʒi.
Stramonii extractum	gr. $\frac{1}{4}$ increased to gr. i. or more.
Strychnia (salts of)	gr. $\frac{1}{16}$ “ gr. $\frac{1}{2}$.
Zinci sulphas	{ gr. i. to gr. v. or more (tonic). ℥r. x. to ʒss. “ (emetic).

TABLE,

Showing the quantity of Opium and certain Preparations of Antimony, Arsenic, Iodine, and Mercury, contained in their respective Pharmaceutical Compounds.

Confectio opii, contains	gr. i. of opium in	gr. xxxvi.
Linimentum opii	gr. iii. “	fʒss.
Pilula saponis composita	gr. i. “	gr. v.
———— styracis composita	gr. i. “	gr. v.
Pulvis cretæ comp. cum opio	{ gr. i. “	℥ii.
———— ipecacuanhæ compositus	{ gr. i. “	gr. x.
———— kino compositus	gr. i. “	℥i.
Tinctura camphoræ composita	{ gr. ii. “	fʒi.
———— opii	gr. i. “	℥xix.
Vinum opii	gr. i. “	℥xix.
Hydrargyrum cum cretâ	gr. i. of mercury in	gr. iv.
Linamentum hydrargyri compositum	{ ʒi. “	ʒvi.
Pilula hydrargyri	gr. i. “	gr. iii.
Unguentum hydrargyri fortius	{ ʒi. “	ʒii.
Unguentum hydrargyri mitius	{ ʒi. “	ʒvi.
Pilula hydrargyri chloridi composita	{ gr. i. of calomel in	gr. iv.
Liquor hydrargyri bichloridi	{ gr. i. of bichloride in	fʒiii.

Liquor potassæ arsenitis	gr. i. of arsenic in fʒiiss.	
Vinum antimonii potas-	} gr. i. of tartar-emetic in ʒss.	
sio-tartratis		
Tinctura iodinii compos-	} gr. i. of iodine	} in ℥xl.
ita		
Unguentum iodinii com-	gr. v. iodine	
positum	gr. x. iodide of potass. }	} in ʒiss.

TABLE,

Of the Doses of Medicines which may be given at different Ages on the supposition that the Dose for the Adult is represented by 40.

(Hufeland.)

Years	25	20	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Doses	40	35	30	29	28	27	26	25	24	23	22	21	20	18	16	13	10
Months	11	10	9	8	7	6	5	4	3	2	1	½					
Doses	9	-	8		7		6		5	4	2	1					

PART II.

PRACTICE OF MEDICINE.

CLASSIFICATION OF DISEASES.

IN former editions of this work, Cullen's Nosology was followed; in the present, that order of arrangement is adopted which seems most likely to be useful in a practical work. It is not founded upon any theoretical principles, but is intended to bring together those subjects which have the most obvious connexion with each other.

The diseases are first divided into *general* and *special*. The first division has six subdivisions: 1. Febrile diseases without essential local complication. 2. Febrile diseases arising from local irritation. 3. Febrile diseases with essential local complication. 4. General diseases (not febrile) without essential complication. 5. General diseases (not febrile) with essential local complication. 6. Local diseases affecting all or several of the textures or organs of the body.

The second division consists of eight subdivisions: 1. Diseases of the nervous system. 2. Diseases of the organs of circulation. 3. Diseases of the organs of respiration. 4. Diseases of the primæ viæ, organs of digestion, and chylopoietic viscera. 5. Diseases of the urinary organs. 6. Diseases of the organs of generation. 7. Diseases of the organs of sense. 8. Diseases of the skin and its appendages.

The several divisions are treated in distinct chapters, an arrangement which is adopted solely on account of its convenience, and not in pursuance of any general theory. The subjects contained in the several subdivisions are placed at the head of the respective chapters.

GENERAL DISEASES.

CHAPTER I.

I. FEBRES—FEVERS.

GENERA.

Continued Fevers.

- I. FEBRIS EPHEMERA . Ephemeral Fever.
- II. SYNOCHA Inflammatory Fever.
- III. TYPHUS { MITIOR . Nervous Fever.
 { GRAVIOR . Putrid Fever.
- IV. SYNOCHUS Mixed Fever.

Intermittent Fevers.

- I. QUOTIDIANA Every-day Ague.
- II. TERTIANA Third-day Ague.
- III. QUARTANA Fourth-day Ague.

Remittent Fevers.

- I. FEBRIS REMITTENS . Marsh Remittent.
- II. SYNOCHUS ICTERODES . Yellow Fever.

CONTINUED FEVERS.

Definition.—After shivering, languor, weakness, and loss of appetite, increased heat, frequent pulse, prostration of strength, and disturbance of most of the functions, without well-marked remissions, and without primary local disorder.

FEBRIS EPHEMERA—EPHEMERAL FEVER.

SYNONYM—SIMPLE FEVER.

GENERIC CHARACTER.—The symptoms of continued fever, in a slight degree, and the several stages of the disease of short duration, so that the disease often runs its entire course in twenty-four hours.

SYMPTOMS.—After slight rigors, of short duration, with nausea, loss of appetite, and feelings of indisposition, increased

heat of surface, headache, a frequent pulse, a furred tongue, and slight thirst. These symptoms generally terminate by perspiration.

CAUSES.—Exposure to cold, a meal of unwholesome food, a debauch, over-fatigue, the contagion of typhus fever acting upon a strong constitution (or that of any of the exanthemata acting on a person who has already had the disease once!).

DIAGNOSIS.—From the more severe forms of continued fever by the mildness of the symptoms. Caution, however, is necessary in expressing an opinion as to the real nature of any febrile affection, as the first onset of severe and prolonged cases of continued fever, and of the exanthemata, is often not more strongly marked than a case of simple or ephemeral fever.

PROGNOSIS.—Favorable in proportion to the mildness of the symptoms, but guarded, bearing in mind the fact stated in the last paragraph.

TREATMENT.—Rest in bed, farinaceous food, and cooling drinks, pure air, and a gentle saline purgative. Care must be taken that the fever be not increased by any imprudence on the part of the patient.

SYNOCHIA—INFLAMMATORY FEVER.

GENERIC CHARACTER.—After severe rigors, a steady and great increase of heat; pulse strong, large, and frequent; urine high-colored, and depositing a red sediment; the functions of the mind not disturbed; little diminution of muscular power; tending generally to terminate in sweating.

SYMPTOMS.—Lassitude and general anxiety, coming on, for the most part suddenly, with nausea or vomiting, and a frequent and feeble pulse; succeeded, after a variable interval, by headache, pain in the back and loins, and rigors, terminating in a violent and continued heat and redness of surface, with flushing of the countenance, a suffused redness of the eyes, pulsation of the temporal and carotid arteries, intolerance of light and sound, great sense of weight in the head, pains in the limbs, extreme anxiety, hurried respiration; and a frequent, strong, and regular pulse. There is great thirst; the tongue is covered with a white fur, the urine is scanty and high-colored, and deposits a red sediment; and the bowels are costive. There is generally an exacerbation in the evening or at night.

In favorable cases, recovery takes place by critical evacuations; in unfavorable ones, typhoid symptoms come on, in which case the fever becomes the synochus of Cullen.

CAUSES — *Predisposing*.—Plethoric habit of body, with a strong muscular system, a good and unimpaired constitution.

Exciting.—Sudden alternations of temperature, as in the application of cold to the body when heated; violent exercise; intemperance; the suppression of usual evacuations; repulsion of eruptions; strong passions of the mind; the free use of vinous or spirituous liquors; contagion.

DIAGNOSIS—From Typhus.—By the more sudden accession of the disease, by its arising from the common causes above enumerated, as well as from contagion; by the *strength* and *hardness* of the pulse; by the *whiteness* of the tongue; by the *high* color of the urine, and its affording the lateritious sediment; and by the slight disturbance of the functions of the mind.

PROGNOSIS—Favorable Symptoms.—About the seventh, or in rare cases about the fourteenth day, a moisture appearing upon the skin, succeeded by a universal and natural perspiration; the urine depositing a furfuraceous or lateritious sediment; hæmorrhage from the nose; the appearance of scabby eruptions about the mouth and ears; suppuration of glandular parts; the formation of abscesses; diarrhœa; diminished sensibility; the pulse more slow and soft.

Unfavorable Symptoms.—Intense pain in the head, with violent delirium; extremely laborious respiration; strong, hard pulse, and other symptoms indicating excessive action or a determination to internal organs, when the disease ceases to be synocha, and runs into phrenitis, pneumonia, hepatitis, or other visceral inflammation; picking the bed-clothes; hicough; subsultus tendinum, or starting of the tendons; involuntary evacuations. Recovery may, however, happen under all these circumstances.

Terminations.—In recovery by critical evacuations, in local inflammation, or in typhoid symptoms (the *synochus* of Cullen).

Morbid Appearances.—Traces of local inflammation in some of the internal organs.

TREATMENT—Indication.—To lower excessive action.

1. By rest, or diminishing or removing those natural impressions which, in the febrile state, become morbid stimuli; such are impressions upon the senses, the exercise of the mind, food, light and sound, the contents of the intestinal canal, &c.

2. By diminishing the quantity of the circulating fluids, and lowering the tone of the vascular system: this is to be effected by bleeding, depressants, laxative clysters, saline purgatives, cold ablution, spunging with cold fluids, cooling drinks, free ventilation, light bed-clothes, &c.

At the commencement, a copious and rapid evacuation of blood will generally be necessary, followed, according to the strength and hardness of the pulse and the urgency of the

symptoms, by smaller bleedings. If there is much head affection, leeches may be applied to the temples, and cold lotions or ice to the shaved head.

The rule with regard to venesection in this and all cases is that we should be guided by the effect produced, and not by the quantity of blood abstracted, and therefore we can never prescribe the exact amount to be taken. One person will faint on the removal of zvj. , and another will bear the loss of xlx. Whenever blood-letting is required, the patient should be placed in the sitting or erect posture, a free orifice should be made in the vein, and the blood should be allowed to flow till the approach of syncope. The effect produced should be followed up immediately by tartar-emetic, in doses varying from one eighth to a sixth or fourth of a grain, according to the severity of the symptoms. The test of its favorable action will be a lowering of the strength and hardness of the pulse, a diminution of external heat, and an increase of the secretions, especially of the perspiration.

Local complications must be treated in the same way as idiopathic diseases of the organs affected. If the disease assume the typhoid character, it must be treated by the remedies appropriate to typhus.

TYPHUS—NERVOUS, OR PUTRID FEVER.

SYNONYMS—PRISON, JAIL, HOSPITAL, CAMP, ADYNAMIC FEVER.

GENERIC CHARACTER.—A contagious pyrexia, accompanied by extreme prostration of strength, great disturbance of the mental functions, diminished sensibility to external impressions and internal sensations.

Species.

1. Typhus mitior Low nervous fever.
2. Typhus gravior Putrid fever.

TYPHUS MITIOR—NERVOUS FEVER.

SYMPTOMS.—Languor and lassitude, coming on in most cases gradually, and accompanied by alternate chilliness and flushing; giddiness; pain in the head, back, and limbs; dullness and confusion of thought; dejection of mind; nausea and loss of appetite; short, anxious respiration; and a frequent, weak, and often intermittent pulse. At first, the tongue is moist and covered with a whitish mucus, but soon becomes dry, brown, and tremulous; there is little thirst; the urine is pale and watery; and low, muttering delirium sets in, from which, however, the patient is easily roused, so as to answer questions.

As the disease advances, the heat often becomes very great,

rising several degrees above the healthy standard ; and the skin gives a peculiar pungent sensation to the hand ; the tongue is dry and brown, or morbidly red ; the patient is very drowsy, but his sleep is disturbed by frightful dreams ; he is less easily roused, and his answers are more slowly given. The suffused redness of the eyes, and the flushed countenance so void of expression, give a peculiar aspect to the patient which is highly characteristic of this disease. Occasionally, delirium, accompanied by constant jactitation, and by frequent attempts to get out of bed, takes the place of the low, muttering, drowsy state just described. In a still more advanced stage of the disease, the pulse becomes intermittent or irregular ; the urine is scanty, high-colored, and fetid ; the bowels relaxed ; and the skin sometimes bathed in a profuse perspiration. Involuntary discharge of fæces, retention of urine, total loss of power, subsultus tendinum, coma, cold extremities, and convulsions, precede the fatal termination.

CAUSES—Predisposing.—Weak and delicate habit of body, accompanied by much sensibility and irritability ; all causes which impair the strength, such as over-exertion of mind or body ; sedentary habits ; depressing passions of the mind ; poor living ; all excesses ; intemperance and profuse evacuations ; warm climates ; cold and wet seasons ; filth and over-crowding ; also, all habits of life which tend to produce local disease, especially habits of intemperance.

Exciting.—Contagion. Intemperance ; exposure to cold and wet ; those causes which, in constitutions so predisposed, would induce synocha.

DIAGNOSIS—From typhus gravior.—By the attack being more gradual, and the symptoms much more mild, both at the commencement and in the progress of the malady (vide Typhus gravior). There is less heat and thirst, less frequency of pulse, less excitement, and the evacuations are less offensive.

PROGNOSIS—Favorable Symptoms.—About the seventh, fourteenth, or twenty-first day, the tongue peeling and becoming moist, first at its edge, afterward on its surface ; a moisture breaking out upon the skin ; a gentle diarrhoea ; salivation, not unfrequently accompanied with aphthæ ; the pulse becoming fuller and more slow ; the cessation of delirium, with some return of sleep and appetite ; the appearance of scabby eruptions about the mouth, or of phlegmonous tumors in different parts of the body ; the urine increasing in quantity, and depositing a sediment.

Unfavorable Symptoms.—All those indicating extreme debility ; as, diminished energy of the brain, marked by a continued state of insensibility or confusion of intellect, with low muttering delirium ; muscular debility, indicated by the presence

of convulsions, subsultus tendinum, tremulous motion of the lips, tongue, and other parts; impeded deglutition; by the patient lying prostrate on his back with extended arms, or insensibly gliding down to the bottom of the bed; falling of the lower jaw; involuntary evacuations; small, rapid, intermittent pulse; hiccough; partial sweating about the breast and head; a peculiar yet indescribable expression of anguish in the countenance; picking of the bed-clothes; catching at imaginary objects in the air. All these symptoms may occur, and recovery happen; but in general they are fatal.

Morbid Appearances.—In simple or mild typhus, there is no morbid alteration discoverable on examination after death; but in complicated cases, there is often disease in the head, chest, or abdomen. The local complications of most frequent occurrence are, inflammation and ulceration of the mucous membrane of the intestines, pneumonia, and inflammation of the membranes or substance of the brain.

Treatment—Indications.—I. To remove, at the onset of the disease, all existing causes of irritation.

II. To diminish, during the course of the disease, febrile excitement, without, at the same time, permanently diminishing the strength of the patient.

III. To subdue any local inflammation which may set in.

The *first indication* is fulfilled by the operation of an emetic, followed by a saline aperient, or a small dose of castor oil. If the previous state of the bowels seem to require it, a dose of some of the milder mercurial preparations may be previously administered. Complete rest of mind and body, external quiet, cleanliness, and a free supply of pure air, should be strictly enjoined from the first.

The *second indication* is best fulfilled by such remedies as do not produce permanent debility: general blood-letting should be avoided, and local repletion reserved for local disease; depressants in small doses, especially tartar-emetic in doses of from a tenth to an eighth of a grain, or equivalent doses of antimonial wine; saline aperients, or small doses of castor oil, at short intervals; a strict farinaceous diet; cold drinks, of which iced water is the best, and free ventilation.

In fulfilling the *third indication*, the necessity of sparing the blood and strength of the patient should be constantly borne in mind. As the brain suffers more or less in all cases, it is desirable to guard against inflammation by having the head shaved, and applying cold water, iced water, refrigerating lotions, or the ice-cap, according to the severity of the existing symptoms. If the heat of the skin rises above the natural standard, cold spunging should be used. Other local inflammations must be treated by the cautious application of leeches, the milder counter-ir-

tants, and depressing remedies in moderate doses. If the patient is extremely weak, local applications must be combined with stimulants, and toward the close of the disease, when much debility is present, tonics, stimulants, and nourishing diet, according to the degree of debility, should be had recourse to.

Throughout the disease the patient should be watched, so that new local complications may be treated as soon as they arise. It must also be borne in mind that, in consequence of the diminished sensibility of the patient to internal as well as external sensations, inflammation of internal organs may occur, and make some progress before it is discovered. It is, therefore, not to the sensations of the patient, but to the other symptoms and signs of disease, that the medical man must trust for early information of the presence of local complications. It is especially necessary, in all cases of typhus fever, to ascertain the state of the urinary bladder, and, if retention of urine exist, to make frequent use of the catheter.

TYPHUS GRAVIOR—PUTRID FEVER.

SYMPTOMS.—The attack of this disease is much more sudden than that of the preceding, and its progress more violent and rapid; the rigors are extremely severe; the prostration of strength greater and more early, and the expression of anguish and horror more acute; the heat of the skin is often moderate, though in some instances it rises early in the disease as high as 108 degrees of Fahrenheit, and conveys a peculiar stinging or burning sensation to the touch; the pulse is frequent, small, and sometimes hard; there is intense pain in the head; singing in the ears; preternatural throbbing of the temporal and carotid arteries; ferrety redness of the eyes; extreme anxiety, and violent delirium. There is nausea and bilious vomiting; the tongue is dry, and covered with a brown or black crust; the breath is hot and offensive; fetid sordes accumulate about the teeth and lips; the urine, at first pale, at length becomes extremely high-colored and offensive, and, toward the end of the disease, often deposits a dark or black sediment.

In the advanced stages of the disease, hæmorrhages break out from different parts of the body; blood is effused under the skin, forming petechiæ, maculæ, and vibices. The abdomen grows swollen and tense, and the excretions become extremely offensive, and are passed involuntarily; the fæces are black, the urine is passed in bed, or retained; the features are changed and sharpened; low muttering delirium takes the place of the excitement of the first stage, accompanied by sub-sultus tendinum and picking of the bed-clothes; there is great prostration of strength, difficult deglutition and respiration;

gangrenous aphthæ appear about the mouth and throat; the pulse sinks and intermits; the extremities grow cold, and covered with a viscid cold sweat; hiccough ensues, and death soon follows.

Morbid Appearances.—Putrefaction rapidly advancing, the mucous membrane of the lungs and intestinal canal softened or gorged with a thin black blood. Results of inflammation in some cases observable in the head, chest, and abdomen; in other instances there is no disorganization apparent, but a rapid tendency to decomposition of the viscera and other parts of the body. The most common morbid appearance is ulceration of the intestines.

CAUSES—*Predisposing.* All those causes inducing debility already enumerated under typhus mitior; want of cleanliness; over-crowding; confined air; close and humid state of the atmosphere.

Exciting.—Contagion, if not the only, is the chief exciting cause. It has been frequently traced to contagion, but has never been satisfactorily traced to any other cause. It is true that it occurs in the midst of poverty, want, and filth, and especially in badly-drained streets and alleys, and ill-ventilated houses; but as these are the situations in which contagion is most likely to lurk, the coincidence of fever with these conditions can not be admitted as a proof that they are alone sufficient to produce it. The question is a difficult one, but, fortunately, of no practical importance. The same hygienic precautions which will remove the other assumed causes, will both prevent the concentration of infection, and tend to protect the body from its effects.

A disease resembling true typhus may be produced by other causes besides contagion. Thus, local inflammation occurring in broken constitutions sometimes produces general febrile symptoms, allied in character to those of typhus; such is also the case with synochus occurring in unhealthy persons. The febrile symptoms which accompany pneumonia sometimes take the same shape, and severe and long-continued inflammation of the mucous membrane of the intestines, in rare instances, takes on the same character. Typhus may also supervene on all deep-seated inflammations, in severe burns, wounds, fractures, phlebitis, dissection wounds, local injuries, and eruptive fevers. The history of the case, however, will generally suffice to distinguish idiopathic fevers of all kinds from the effects of local inflammations.

MM. Gaspar and Magendie caused symptoms similar to those of typhus by injecting putrid matter into the veins of animals; and the more concentrated the poison, the more violent was the fever, and the more severe the local inflammation which succeeded it.

DIAGNOSIS—*From Typhus mitior.* Vide Typhus mitior.

From Synocha.—By the sudden and great prostration of strength which ensues on its first attack; by the brown or black tongue; the livid flush of the countenance; the black and fetid sordes about the teeth; the less degree of strength, yet greater frequency and hardness of the pulse; the acrid and more intense heat of the skin; the symptoms of putrescency above-mentioned.

PROGNOSIS—*Favorable.* The countenance preserving nearly its natural state, the look firm and clear, and the face not attenuated. A crisis accompanied by any of the symptoms mentioned under typhus mitior; an abatement of febrile heat and thirst; a gentle, warm moisture diffused equally over the whole surface of the body, succeeded by increased fullness and strength, with diminished frequency of pulse; the absence of delirium and stupor; the absence of extreme prostration of strength; the petechiæ or hæmorrhages being of a florid red color.

Unfavorable.—In addition to those already enumerated as marking extreme debility in typhus mitior, the peculiar appearance of the patient; his eyes inflamed and staring, his speech thick, the sound of his voice altered; extreme anxiety and perpetual watchfulness; increased vascular action and diminished muscular power; high delirium; loss of sight; dry, black tongue; nausea, or constant vomiting; fetid and involuntary excretions; passive hæmorrhages; dark-colored, livid, petechial eruptions; yellowness of the skin; tension of the abdomen; black and gangrenous aphthæ, gangrene of blistered places; partial cold sweats; cadaverous smell of the whole body.

TREATMENT—*Indications.*—I. To moderate fever. II. To subdue local inflammations and relieve local congestions. And, III. To support the patient's strength.

I. The first indication must be fulfilled at as little expense of strength as possible. If, at the onset of the disease, general bleeding appear necessary, blood should be withdrawn from a large orifice, and in the erect or sitting posture, so that the greatest effect may be produced with the least loss of blood. But depletion will rarely be required in cases of typhus fever, except in plethoric persons, when the system, previous to the invasion of fever, was overloaded with blood. Depressants in small doses, gentle aperients, cool air, cooling drinks, and cold spunging, where the surface is hot and dry, will suffice to subdue any degree of fever present in the majority of cases of typhus.

II. Local inflammations and congestions must be subdued or relieved by as small an expenditure of blood and strength

as possible. The application of a few leeches, cold lotions, or mustard poultices, as counter-irritants, will go far in the removal of local complications. The lancet must be employed rarely, and with great caution.

III. As the patient's strength requires to be economized during the first stage of fever, so does it require to be supported in the last stage. Stimulants must be administered with care and caution, our selection and the dose employed being proportioned to the existing debility. Where the debility is not extreme, the remedies belonging to the class of tonics, such as quinine, mineral acids, and the infusions of cusparia or serpentaria, may be given. In greater degrees of debility, the diffusible and spirituous stimuli should be preferred, such as ammonia, spirits of sulphuric or nitric æther, wine, or brandy.

Ammonia may be used with great advantage in those cases where some doubt is entertained of the propriety of administering stimuli. Its effects being of short duration, should it be found to raise the pulse or increase the fever, it may be withdrawn, without leaving behind it any permanent bad effects.

The choice of stimulants should be determined by the degree of the debility, the amount of febrile action, the presence or absence of local affection, and the character of the pulse. When the pulse is frequent, hard, and quick, stimulants are contra-indicated; but when the pulse is frequent, small, and compressible, or infrequent and compressible, stimulants may be given with safety. When stimulants render a frequent pulse less frequent, or but slightly increase the number of an infrequent one, they may be safely administered. The practitioner will do well to visit patients laboring under fever soon after the administration of the first dose of the stimulant, and ascertain by these simple tests whether or not the treatment he is adopting is a safe one.

Another indication is often added to the preceding, that of "obviating the putrid tendency of the fluids." There is one sense in which the fluids in typhus have a putrid tendency; they undergo rapid decomposition as soon as they are removed from the body, and the discharges are generally extremely offensive. This indication, therefore, may be added to the foregoing. It may be fulfilled by improving the condition of the blood. The blood in typhus is found to be poor in solid animal ingredients and in salts. The only means of supplying the first deficiency is by such articles of diet as are likely to find their way into the circulation, even without undergoing the process of digestion. The farinaceous liquids, and the lighter broths, are to be preferred for this purpose, and

these may be administered either by the mouth or by injection, or in both ways. The deficiency of salts may be supplied by saline drinks, such as imperial, nitrate of potash in barley water, &c., or saline effervescing draughts. The acescent fruits, such as lemons, oranges, grapes, roast apples, &c., from their acknowledged efficacy in sea-scurvy, may be employed in fever with the effect of improving the condition of the fluids. If hæmorrhage occur, the acidulated infusion of roses, or the mineral acids in combination with tonic infusions or stimulating remedies, are indicated.

The patient should, at the same time, be placed in those circumstances which are known to be most favorable to health. The utmost attention should be paid to cleanliness, excretions should be promptly removed, the linen should be frequently changed, and the sick-chamber should be well ventilated and fumigated by sprinkling the room with vinegar or camphorated spirits, or a solution of chloride of lime or soda.

In cases of extreme restlessness, cold applications to the head, and a stream of warm or cold water poured from the height of a few inches upon it, will often procure sleep where other remedies fail. As a general rule, opium is inadmissible where the functions of the brain are already much disturbed, but cold thus applied is not counter-indicated in any condition of the system. In using it, its effects should be narrowly watched, and the hand should be kept on the pulse. Its application should be gradual, as a shock, however slight, may prove fatal in one already greatly exhausted by disease. In extreme debility, great care should be taken to prevent all sudden changes of position; and in any case, it would be better to apply this remedy while the patient is in the recumbent posture. This may be easily done by putting a mackintosh round the patient's neck, and conducting the water as it flows over the head into a vessel placed for its reception.

The observations made under the head of typhus mitior, as to the necessity of constant watchfulness and the use of the catheter, if required, apply equally in the treatment of this disease.

[Typhus fever, in the form in which it prevails in Great Britain, exists occasionally in the United States as an epidemic, especially in crowded and ill-ventilated places in cities. Scarcely a year passes without its introduction into the city from the numerous passengers who arrive from Europe, and abundant evidences exist of its contagious nature. The most prominent symptoms it exhibits are a constipated state of the bowels, dark yellow tongue, stupor and delirium, dry, dusky hot skin, and a full and rather strong pulse. We can not too strongly recommend the use of cold water in this dis-

ease to the head, as advised in the text, when coma or delirium exist.]

SYNOCHUS—MIXED FEVER.

This is a compound of synocha and typhus. It commences with some of the symptoms of the former, and terminates in those of the latter. At first, the pulse is strong and hard, the tongue white, the urine high-colored; soon, however, the tongue becomes yellow, then brown; the pulse loses its strength, yet retains its hardness, and becomes more quick; prostration of strength supervenes; and the disease assumes the form of typhus mitior or gravior, as certain predisposing circumstances of constitution or of cause may happen to be present.

The *treatment* has been already fully described. In the commencement, it will be that laid down for inflammatory fever: the utmost caution must, however, be employed in the use of those means which lower the tone of the system, especially bleeding, so that sufficient strength may be left to combat the succeeding stage, in which the treatment of typhus must be employed.

ADDITIONAL OBSERVATIONS ON CONTINUED FEVER.

The subject of continued fever is too important to be dismissed without some attempt to present it in a more general point of view, free from those minute distinctions which only tend to produce confusion. There is a synocha, a synochus, and a typhus; that is to say, there is a form of continued fever with high action, and a tendency to *acute local inflammations*; a form of fever with low action, and a tendency to local *congestions*; and a third form, beginning with high action, and ending in low action. Now all these forms of fever have been observed in the same city in different epidemics. In Edinburgh, for example, continued fever took the form of synocha in the early epidemics of 1817–20; it assumed a character more nearly allied to synochus in 1826–29; while in the latter epidemics, it has put on the character of typhus from its first invasion. Nevertheless, all these epidemics have agreed in two essential points: they were all continued fevers, and were all distinctly referable to contagion. Their minuter differences arose from causes little understood, but their increasing severity and fatality, both in Edinburgh and Glasgow, may be safely attributed to increasing poverty and destitution.

A few observations on continued fever in general, arranged under distinct heads, can not fail to be useful to the practitioner.

Nature of Continued Fever.—It is now almost universally admitted that continued fever is a general disorder or disease of the system not caused by local inflammation, though this is a frequent, but not an invariable consequence. The phenomena of the first stage of this fever are exactly similar to those of an intermittent, but in a minor degree and of longer duration. We observe a cold stage ushered in by rigor or shivering, languor and lassitude, disinclination to mental or corporeal exertion, loss of appetite, constipation, urine diminished, surface of the body cold and pale, pulse smaller and weaker than in health, more or less headache, obtuse pain in the back or limbs, as after fatigue; all which symptoms depend upon a diminished energy of the sensorial and nervous power, and hence most writers maintain that the brain and nervous system are primarily affected in all idiopathic fevers.

These symptoms may continue for three or four days, constituting the first stage or period of congestion; and now the system rallies, the *vis medicatrix nature*, or inherent power in the system to remove or combat all diseases, is exerted, and the state of reaction or excitement is induced, which may continue from the fifth or sixth to the twelfth or fourteenth day. During this period all the functions of the body are excited, the sensorial powers are active, there is increased headache, intolerance of light and sound, great restlessness and irritability, flushed face, rapid pulse, hot skin, great thirst, &c. This state corresponds to the hot stage of an intermittent, but is of longer duration; and the hurried circulation may induce inflammation in any part of the body predisposed to disease, and especially in the vascular organs, as the brain, lungs, and abdominal viscera, the gastro-intestinal mucous membrane, spleen, kidneys, or uterus. Local inflammation, therefore, is the consequence, and not the cause of fever. Daily observation incontrovertibly proves that fever may go through its whole course without inducing local inflammation, though this is a frequent complication.

Inflammation will appear in different organs, according to the predisposition of the patient; it will attack the brain in one, the lungs in another, the digestive system in a third, and so on. The complication of fever with local inflammation of vital organs renders the disease highly dangerous, and the treatment extremely difficult. This frequent complication has also thrown doubts on the real nature of fever. Some observers, as those of Paris, witnessing epidemics in which gastro-intestinal irritation exists in the majority of cases during life, and a peculiar affection of the glands of the intestines after death, have regarded this state of the intestinal canal as the essential cause of fever; hence the theory of

Broussais : others, again, in our own country, having observed cerebral complications in the majority of cases, have assumed them to be the cause. There is no real ground for these theories, and the majority of medical men are now convinced of their fallacy. There is every reason to anticipate an entire unanimity of opinion on this subject, as all the best and most recent authorities agree in representing fever as an essential disease, *sui generis*, liable to be complicated with, but not caused by, local affections.

[Fever is, indeed, a disease affecting the whole system—the cerebro-spinal and animal faculties, the organic functions, the fluids, and the entire organization. The whole of the intellectual faculties are at times impaired ; the judgment perverted ; the perceptive faculties disordered, while the external senses perform their parts imperfectly, and convey false impressions to the sensorium ; secretion, digestion, assimilation, together with all the appetites, undergo great alterations. The fluid and solid parts of the body are greatly changed both in their appearance and properties. The blood is altered in various ways, and the solids are changed both in color and consistency. The mode of invasion and the progress of fever correspond with the universal nature of the affection ; at one time coming on with pain, lassitude, chilliness alternated with heat ; at another it makes a sudden onset, without any evident cause, affecting the whole nervous system, and prostrating it to a fatal termination ; while in a third, the heart and circulation are at once excited to violent action, independent of any local affection.]

Cause of Fever.—A similar agreement seems likely to take place as to the cause of fever. Synocha, synochus, and typhus are all held, by the best authorities, to be communicated from one person to another, the peculiar character of the fever being determined by the season, the epidemic constitution, as it is called, and the condition of those whom it attacks. It is not, however, denied that local disease may give rise to febrile symptoms difficult to distinguish from those of true continued fever.

Laws of Infection.—1. "All the forms of primary continued fever are communicable, and probably in an equal degree." 2. Fever is probably communicable to all constitutions, though after very variable periods of exposure. 3. The infection is by no means virulent, requiring, in most cases, concentration of the infection itself, and long exposure to it. 4. The infection operates with greatest certainty where cleanliness and ventilation are neglected, and on persons whose bodies are enfeebled by privation. 5. One attack of fever is, in some measure, a protection against future ones. (Dr. Tweedie, Physician to the London Fever Hospital, has had it three times, and Dr. Christison, of Edinburgh, six times.) 6. The existence of other

febrile or inflammatory diseases acts as a protection as long as they last, but they probably leave behind them a greater susceptibility. 7. "The infection of fever takes effect, on an average, more readily among those who are constitutionally infirm than among the robust." (The accuracy of this assertion has lately been called in question.) 8. "The infection of fever diminishes in effect as life advances." 9. "The sexes seem equally exposed to receive infection." 10. The poison of fever is very apt to take effect under the casual co-operation of cold, fatigue, excesses, and other occasional causes of the febrile inflammations. 11. "The ravages of fever are invariably promoted by all circumstances of national or public poverty and distress." 12. "Fever is probably apt to extend its devastations with peculiar impetuosity in localities which are damp or exposed to noisome effluvia, arising from organic matter in a state of decay." 13. "In regard to fever, it seems probable that fomites (substances by which infectious effluvia are absorbed) do not contribute much to its propagation, and that infection is not retained by them long." (Christison, *Libr. Pract. Med.*, vol. i., p. 158, et seq.)

STATISTICS OF FEVER—*Influence of Age on the Prevalence of the Disease.*—From 5 to 10 years, 1 in 134 of the population living at that age; from 10 to 15, 1 in 66; from 15 to 20, 1 in 41; from 20 to 30, 1 in 53; from 30 to 40, 1 in 85; from 40 to 50, 1 in 140; from 50 to 60, 1 in 271; and above 60, 1 in 929. The chance of seizure between 15 and 20 being represented by 100, it becomes in round numbers between 20 and 30, 78; between 30 and 40, 49; between 40 and 50, 29; between 50 and 60, 15; and above 60, $4\frac{1}{2}$. (From data supplied by Dr. Cowan, for the epidemic of Glasgow in 1836).

Influence of Sex.—Males, 49·5 per cent.; females, 50·5 per cent. (Glasgow epidemic). Males, 43 per cent.; females, 57 per cent. (Edinburgh epidemic of 1819). It must be borne in mind, that females are always in excess of males, and that they are more employed about the sick. When this is taken into account, the influence of sex will appear inconsiderable.

MORTALITY OF FEVER—*Order of Fatality.*—Synocha rarely fatal, synochus more frequently, typhus most frequently of all. Ex. In the Edinburgh epidemic of 1817–20, which presented the inflammatory character (synocha), the mortality was 1 in 22, 1 in 25, or 1 in 30; but in the recent epidemics of Edinburgh, which have assumed more and more of the typhoid or adynamic character, the mortality has been 1 in 10·33 (epidemic of 1826–7); 1 in 10 (epidemic of 1837); and 1 in 6·27 (epidemic of 1838). The following is the mortality observed in various epidemics in this climate. In Edinburgh, from the year 1817 to 1838, the mortality ranged from 1 in 30 to 1 in

6·27 ; in Glasgow, in the epidemic of 1835–37, from 1 in 15 to 1 in 10 ; in Manchester, from 1818 to 1828, from 1 in 11·75 to 1 in 6·66, the average mortality for the whole period being 1 in 8·25 ; in the London Fever Hospital, during the same number of years, from 1 in 10 to 1 in 5, the average of the whole period being 1 in 6·50. In the year 1816, according to Dr. Marcet, one fourth of all the fever cases admitted into Guy's Hospital died ; while one half of all the seizures proved fatal in Dr. Willan's experience at the Carey-street Dispensary. In the Parisian fever, complicated with gastro-enteric affection, the mortality, according to Louis, has been as high as 1 in 2·9.

Mortality at different Ages.—In the Edinburgh epidemic of 1818–20, in which the mortality was 1 in 22 for all ages, the deaths under 20 were 1 in 65 ; between 20 and 30, 1 in 29 ; between 30 and 40, 1 in 18 ; between 40 and 50, 1 in 11·4 ; and between 50 and 60, 1 in 6. These numbers represent the general rule, but this rule is liable to exception. Thus, in the London Fever Hospital, during the years 1828–29, when the general mortality of the hospital was 1 in 7·22, that for children under 15 was as high as 1 in 7·33 ; between 15 and 30, 1 in 9·5 ; between 30 and 50, 1 in 7·33 ; and above 50, 1 in 2·5.

Mortality in the two Sexes.—According to the tables of Dr. Cowan, of Glasgow, founded on an examination of 2259 patients, the deaths for all ages amount to 1 in 6·75 among the males, and only 1 in 11·2 among the females ; below puberty the proportion is 1 in 25 for boys, and 1 in 28 for girls. Dr. Welsh's tables, formed from 743 patients, observed in the Edinburgh epidemic of 1817–20, give 1 in 16 for males, and 1 in 30 for females ; under 20 years of age, the mortality for both sexes was 1 in 68 ; above 20, for men, 1 in 11 ; for women, 1 in 24. This disparity after 20 is ascribed by Dr. Christison, and with apparent justice, to the greater prevalence of intemperance among men.

Duration of Continued Fever.—From tables contained in Dr. Davidson's Thackery Prize Essay, it appears that the duration of synocha (by him named febricula), in 30 cases, was from 3 to 10 days, the average being 8 days for males and females ; while the duration of eruptive typhus, calculated from 181 cases, was 19·7 days for males and 21·3 days for females, the average for the two sexes being 20½ days. The least duration in males was 12 days, the greatest 29 days ; in females, the least duration was 13 days, the greatest 54 days. The duration of the disease is calculated from its commencement to the establishment of complete convalescence.

Critical Days.—The ancient doctrine that favorable cases of fever have a decided tendency to terminate on certain days, called critical days, has lately been confirmed by the observa-

tions of Dr. Welsh in the Edinburgh epidemic of 1819. The critical days are 3, 5, 7, 9, 11, 14, 17, 20; the non-critical are the intervening days, with the exception of the 4th and 6th, which are considered as secondary critical days. Of 690 cases, a crisis took place in 470 on critical days; in 52 on the secondary days; and in 108 on non-critical days. The cases included all the forms of fever.

Secondary Affections in Continued Fever—Head Affections.—These consist in inflammation of the membranes of the brain, and more rarely of its substance, in cases of synocha or inflammatory fever; and of *congestion* in cases of typhus. This congested state of the vessels occurs more or less in all cases of typhus fever in this country, but appears to be of much less frequent occurrence in Paris. It is indicated by dingy redness of the skin of the face, increased heat of the integuments of the face and scalp, and minute injection of the conjunctiva of the eyes with dark blood, an extreme degree of stupor, constant muttering delirium, increased frequency, with great feebleness of pulse, irregular distribution of heat over the surface of the body, a dark, dry, furred tongue, protruded with difficulty, and slowly withdrawn: all the symptoms, in short, of typhus in its most aggravated form.—*Chest affections: Catarrhal symptoms* often occur very early in the disease, arising from the same state of congestion of the vessels of the air-passages which exists in the membranes of the brain. This complication is indicated by cough, at first dry, and afterward accompanied with clear mucous expectoration; there is slight dyspnoea, and the ear detects the mucous rhonchus. This affection, though of frequent occurrence in some epidemics, is rarely attended with much danger, and in favorable cases is soon and easily subdued. *Pneumonia and pleurisy* may also occur as secondary affections. Their symptoms are apt to be masked by the torpor of the senses and of the mind, which renders the patient insensible to pain. The stethoscopic signs are the same as in idiopathic affections of the same kind. Aphthous ulceration of the mouth and throat, cynanche tonsillaris, cynanche laryngea, and cynanche parotidea, are of occasional occurrence. The latter may often be regarded as a favorable symptom.—*Affections of the abdomen: Gastritis.* Patients are often affected, toward the end of the first and beginning of the second week, with sickness, vomiting, and pain and tenderness in the epigastrium. These symptoms differ in no respect from those of idiopathic gastritis. The pain, which is rarely severe in the idiopathic gastritis, is only made apparent by deep pressure. When it is complicated with severe head-affection, it is necessary to watch the expression of the patient's countenance during the pressure, as this will often be-

tray uneasiness when he does not complain of pain.—*Enteritis*. This affection is indicated by distention and firmness of the abdomen, pain and tenderness on pressure, and yellow diarrhœa. This latter symptom, however, is not always present. The same remark applies to the tenderness in enteritis as in gastritis, and the same means must be used to ascertain its existence. Inflammation of the mucous membrane and its consequences are much less constant accompaniments of typhus in this country than in the epidemics of Paris, of which it forms one of the distinctive characters. The inflammation, when it occurs, may assume the common form of idiopathic inflammation, or may consist in a peculiar affection of the glands of the intestines, presently to be noticed. Perforation of the intestines sometimes occurs. *Hepatic disorder*, accompanied by jaundice, is another complication. All the other viscera of the abdomen are subject to occasional congestion or inflammation.

The Skin.—The skin is the seat of several secondary affections in typhus fever. These are various forms of *petechiæ*, and a peculiar *measly* eruption. Dr. Christison describes the following forms of skin affection: 1. Small, pale-brown, lenticular spots, without elevation or roughness of the skin, and much resembling freckles. This is rare, and met with only in advanced stages of bad synochus or typhus for a short time before death. 2. Small, dark, reddish-looking, roundish, circumscribed, and often closely-crowded spots, without elevation of the skin, and closely resembling flea-bites, but without the dark point in the center which characterizes the flea-bite. Their usual seat is the head, shoulders, forearms, and legs. They occur most commonly in synocha, and generally make their appearance toward the close of the first or beginning of the second week. 3. Spots, more or less numerous, of a pale lake-red or rose-red tint, irregular in shape, not distinctly circumscribed, but rather diffuse round the edge, with sufficient elevation of the skin to impart a sense of roughness to the finger. They present some resemblance to measles, and are occasionally difficult to distinguish from it. They are usually most abundant over the chest, shoulders, forearms, legs, loins, flanks, and abdomen; and they often exist on the abdomen when they are not to be found elsewhere. They occur in some epidemics with much regularity on the fourth day; in others, on the seventh; and they are peculiar to typhus. M. Louis states that they are an invariable concomitant of the intestinal disease, which he considers as the anatomical character of true typhus. This connection of the efflorescence of the skin with disease of the glands of the intestines is by no means constant in the epidemics of this country. *Petechiæ*, in the ordinary

sense of the term, are also of frequent occurrence in continued fever, occurring sometimes early in the disease, but more commonly toward the close of it, and where debility is extreme. The size of the spots varies from that of a pin's head to that of a crown piece. *Erysipelas* is apt to occur as a secondary affection when idiopathic erysipelas is prevalent. *Gangrene* and *sloughing*, preceded by erythema of the skin, are of common occurrence in the advanced stage of the disease in parts submitted to pressure.

Sequelæ of Fever.—*Relapses* are of frequent occurrence in synocha (in one fifth of the cases in the inflammatory epidemic of Edinburgh, in 1807-20, according to Dr. Welsh); they are less common in typhus. They are frequently brought on by want of care and premature exposure to cold, &c., during convalescence. *Edema* is a common consequence of the debility of the capillary vessels. It soon disappears with returning strength. Partial rheumatism, neuralgia, a swelling of the leg resembling phlegmasia dolens, phthisis pulmonalis, mania, and various local inflammations, are mentioned among the occasional sequelæ.

Anatomical Characters.—In the *mucous membrane of the intestines*, inflammation and its consequences, and inflammation and ulceration of the clustered glands of the intestines (Peyer's glands), occupying, for the most part, the ileum near its termination in the cæcum; and more rarely of the isolated glands (Brunner's glands). This disease assumes various forms: as the soft, the hard, the granular, the pustular, the ulcerous, and the gangrenous. Softening of the parenchymatous substance of all the organs: the brain, the heart, the liver, the spleen, the kidney, &c.; softening and ulceration of the mucous membranes lining the several viscera, leading sometimes to perforation; inflammation or congestion of the membranes of the brain, of the pleura, peritoneum, &c.; the several appearances of the skin already described; to which may be added a want of cohesion of the blood itself.

Diagnosis.—From idiopathic local diseases, by the history of the symptoms, the want of correspondence between the severe general disturbance and the comparatively slight local affections, and, in many cases of typhus, by the presence of the peculiar eruptions on the skin.

Prognosis.—*Favorable* in the absence of local complication, or when the local disease is slight; when the debility is not extreme; the tongue still moist or not greatly coated; the pulse steady and compressible, and not very frequent; the respiration infrequent; the skin of moderate and uniform temperature; the countenance clear and not flushed; the eye uninjected, the posture approaching to that assumed by healthy

persons ; the absence of delirium and stupor. To these must be added youth. The *unfavorable* symptoms are the reverse of these. An advanced age ; the existence of severe local disease ; extreme debility ; dry, brown, coated tongue ; frequent, small, and irregular pulse ; skin universally hot, or the temperature unequally distributed ; the countenance muddy ; the eyes suffused ; decubitus on the back ; the body falling toward the foot of the bed ; low, muttering delirium ; stupor ; subsultus tendinum ; picking at the bed-clothes ; involuntary evacuations ; retention of urine ; tympanitis ; petechiæ ; gangrene ; and sloughing of the back and sacrum. In estimating the importance of these symptoms, whether favorable or unfavorable, the character and tendency of the existing epidemic, and of other diseases prevailing at the time, must be borne in mind.

Treatment.—Continued fever can only be effectually treated on general principles, applied to individual cases, with due regard to the character of the existing epidemic, the peculiarity of the patient's constitution, and the period of the disease. Experience has proved that there is no stage of the disease at which remedies will prove effectual in cutting it short, and that it will run a certain course, and endure for a certain period, in spite of remedies. In every stage of the disease, and in every part of the treatment, therefore, the practitioner must bear this fact in mind. If, in the early stage, the disease calls for prompt antiphlogistic treatment, it must be recollected that a period of depression is at hand, and that that depression will be increased by undue activity in the early stage. On the other hand, it must not be forgotten that local complications are apt to occur in the course of the fever, which may be aggravated by a neglect of proper antiphlogistic measures during the period of reaction. Moderation in the use of remedies, constant watchfulness, and early and prompt attention to symptoms of local complication, are peculiarly necessary in all cases of continued fever. The treatment of continued fever will be best understood by dividing the disease into five stages : 1. The incipient period, or cold stage ; 2. The period of reaction ; 3. The middle period, combining the high action of the second period with the debility of the fourth ; 4. The period of debility, in which the symptoms assume more and more of the so-called typhoid character ; and, 5. The period of convalescence.

1. The incipient period, or cold stage. Our object is to shorten this period as much as possible, and to remove from the *primæ viæ* any matter, which, in a later state of the disease, may become a source of irritation. The remedies prescribed, with a view of shortening the first stage, are blood-letting and emetics. Experience has shown that these reme-

dies have no power of cutting short an attack of fever, but they have an undoubted efficacy in shortening the cold stage. If blood-letting is used for this purpose, it should not be carried further than merely to relieve the existing congestion of the vessels. It is strongly indicated where there are signs of existing plethora. Emetics, though they possess no power of cutting fever short, are useful in promoting reaction, and in emptying the stomach of ingesta, which might afterward become a source of irritation. Purgatives may be usefully employed for the same purpose. The treatment of the incipient or cold stage, then, consists in general blood-letting, to remove existing plethora or congestion, and emetics and purgatives to clear the stomach and bowels. The emetic may consist of tartar-emetic and ipecacuanha; the purgative, of castor oil, or the common senna draught.

2. During the stage of *reaction*, which rarely extends beyond the first week, antiphlogistic measures are indicated, the practitioner being guided in the selection of them by the consideration that a period of debility is at hand. Emetics, blood-letting, and cold affusion have all been recommended in this stage, with a view of arresting the fever. There is little reason to believe that the first remedy, emetics, has ever been successfully employed with this view, but instances have undoubtedly occurred in which fever has been cut short by bleeding and cold affusion. These cases, however, are rare, and the cutting short of the fever in this stage can not be reasonably made an indication for treatment. If this result follow, so much the better, but the indication to be borne in mind is simply to reduce action by the smallest possible expenditure of strength. The remedies most efficacious for this purpose are, general and local bleeding, cold affusion, and tartar-emetic. In bleeding, our object is to produce the greatest possible effect at the smallest cost of blood. The patient, therefore, should be supported in the erect posture, if possible, or he should be raised in bed: a free orifice should be made in the vein, and blood be taken, to the approach of syncope. Cold affusion is only applicable when the temperature of the surface is above the natural standard, as measured both by the touch and by the thermometer. Applied on the second, and not later than the fourth day, it has sometimes cut the fever short, but after that period it acts merely as a palliative. *Cold affusion* is one of the most powerful remedies which we possess, and requires to be applied with due caution. Perhaps there are few cases in which it will be necessary to have recourse to this mode of applying cold to the surface. Instead of pouring water over the surface, or dipping the whole body in cold water, it is much better to sponge the entire surface

with warm water, with cold water, or with vinegar and water, and allow it to evaporate until the heat is reduced and the pulse lowered. Cold sponging has this advantage over other modes of applying cold, that it creates no fatigue. When the desired effect has been produced, the body should be carefully dried with a warm towel, and the remedy may be repeated as often as the temperature of the skin rises steadily and uniformly above the natural standard. The head should, at the same time, be shaved and kept cold by cloths dipped in cold lotions, and constantly renewed. *Tartar-emetic* may be administered with advantage in that stage of fever which is accompanied by high action. It may be given in doses of from one eighth to one fourth of a grain every one or two hours, and is advantageously combined with small doses of sulphate of magnesia. The patient should be allowed to drink freely of cold water. Where there is much fever, iced water or ice may be allowed, according to the degree of thirst.

3. In the intermediate stage, or that which intervenes between the stage of reaction and that of extreme prostration—a period which extends from the end of the first week to about the eleventh, or from that to the seventeenth day—no precise plan of treatment can be laid down. If high action is present, antiphlogistic treatment, varying in activity with the severity of the symptoms, must be persevered in; if debility, tonics and stimulants, according to the degree of the debility; and local complications must be treated with an activity proportioned to their severity on the one hand, and the remaining strength of the patient on the other. If there is little febrile action, a moderate degree of strength, and no local complication, no remedies will be needed beyond gentle laxatives, cooling drinks, and saline draughts. If there is restlessness and want of sleep, without local disease, opiates may be resorted to, but their action must be carefully watched.

4. The treatment of the last stage, or that which immediately precedes recovery or dissolution—a period of three or four days—consists in the continued administration of such stimulants as have been found useful in the previous stage; a strict attention to local affections of the skin produced by the previous use of counter-irritants, or the continued pressure upon the integuments of the spine and sacrum; and the use of glysters in place of purgatives. The state of the urine must also be carefully inquired into, and retention guarded against by the frequent use of the catheter. At this period, the wishes of the patient, should he express any, for particular kinds of food, may often be indulged with advantage, provided there is no delirium present. The choice of stimulants in this and the preceding stage will greatly depend upon the

previous habits of the patient. Wine in doses of from two to four ounces daily, increased according to the effect which it produces, will generally suffice for the temperate; but the stronger spirits will often be necessary for those previously accustomed to the use of them.

5. The stage of convalescence requires much care and watching. Two indications are to be fulfilled: to restore the strength, and to guard against relapse. The strength will be best restored by the gradual substitution of nourishment for stimuli, the nourishing quality of the food being increased as the stimuli are withdrawn. When, however, the debility is very great, and, as often happens, there is a constant tendency to fainting, stimulants must be administered frequently and in large doses. In the commencement of convalescence simple farinaceous diet should be prescribed, or farinaceous diet with milk, then the weaker soups, then fish, boiled or fried, then the boiled or roasted meat of full-grown animals. In the regulation of the diet the appetite is the best guide, and this should determine both the quality and the quantity of the food.

A foul dry tongue, increased frequency and sharpness of pulse, flushing of the face, and disturbed sleep, are indications that the diet is too large in quantity or of too nourishing a kind. If the patient is restless, and obtains little sleep, opium or morphia, in combination with a stimulant, may be administered. The cautious regulation of the diet, an avoidance of all violent exertion, and of exposure to cold, will generally prevent a relapse.

The treatment of local inflammations arising in the course of convalescence from continued fever is regulated by the same general principles which apply to the fever itself. They must be subdued at as little expense as possible of blood and strength. General blood-letting will rarely be required, and the application of a few leeches, with tartar-emetic internally, will generally succeed. Counter-irritants may be advantageously employed where the inflammation is not entirely subdued by the local abstraction of blood. The mustard poultice, stimulating embrocations, or a blister applied for a sufficient period to produce redness of the skin without vesication, should be preferred to the full action of a blister. Where the head is the part affected, the constant application of cold in the form of cold lotions or ice-bags, or, if these are insufficient, the cold *douche*, should be preferred to the abstraction of blood.

Prophylaxis.—Spacious and airy apartments for the sick, complete ventilation, fumigations with chlorine, frequent change of linen, and the prompt removal of excretions, are the chief precautions to prevent the spread of contagion.

The attendants on the sick should not be young persons, and they should be selected, if practicable, from such as have already had an attack of fever. During their attendance, their diet should be nourishing, they should avoid excessive fatigue, and be allowed regular exercise in the open air. All unnecessary intercourse of other persons with the sick should be prevented. Rooms which have been occupied by fever patients should be well washed and ventilated, and the bedding and furniture should be freely exposed to the air. More careful precautions will scarcely be required in the case of a disease which is proved by experience not to be virulently contagious.

[For purifying the air of an apartment, there is nothing equal to the free admission of the external air. Fumigation with chlorine, far from being of any benefit, is absolutely injurious, by its stimulating effects upon the surface of the trachea and bronchi, causing constant irritation and cough, while there is no disinfecting action produced by it. The only mode by which it can act is by the union of the chlorine with the hydrogen gas, holding sulphur, phosphorus, &c., in solution, and decomposing them. But the cause of diseases from crowded habitations, from the bodies of the sick, or from vegetable or animal remains, is not the gases escaping, which are speedily diffused, but the organic particles that float about like the watery particles of a mist, and which can only be driven off by allowing the air of the confined apartment to be in constant motion.]

Under the head of prevention, it is necessary to insist on the paramount importance of an efficient system of drainage, both in large towns and in rural districts.

TYPHOID FEVER.

[There is a variety of fever which has of late attracted considerable attention, from the fact that close and extended anatomical investigations have shown the existence of changes of structure, which, it is said, are not found in any other febrile affections. From the resemblance of its general symptoms to ordinary typhus fever, it has been denominated typhoid, although this term has been likewise used to denote a state of sinking and prostration accompanying any kind of febrile affection. The author has referred to anatomical changes of a character identical with those now under consideration, without noticing the distinction that some distinguished men have proposed; the importance, however, of the subject, and the high standing of those who have made it a distinct affection, appear to require a brief notice of its peculiarities as set forth by them. Bretonneau has given it the name of Do-

thinenteritis, from the anatomical characters exhibited on dissection—the development of pustules in the intestines. Writers on this subject in this country, Drs. Gerhard and Jackson, having adopted the term typhoid to designate the disease in question, it would be unnecessary to use any other, as the affection will be sufficiently indicated by its use.

Typhoid fever, therefore, is a disease of the follicular apparatus of the intestines, and is the affection first pointed out by M. Louis in Paris, and verified by anatomical investigations in other parts of Europe and in the United States. Dr. Gerhard, in the American Journal of Medical Sciences for February and August, 1837, describes the disease as it prevailed in Philadelphia in 1836, and proves conclusively that the distinction first pointed out by Dr. Lombard, of Geneva, between ordinary typhus and that form now under consideration, was to be found in the different anatomical conditions of the body. The morbid anatomy of typhoid fever will be stated under its proper head; for the present, it is sufficient to state that it is purely a local affection, in which it differs from typhus, the latter being what may be denominated a disease of the whole system.

SYMPTOMS.—Chills, alternating with heat at the commencement, which soon becomes continued; pulse nearly natural; pain in the head and back; soreness of the limbs, at times with sudden and great prostration; mind confused, with vertigo and disposition to sleep, although when sleep occurs it is unrefreshing and laborious; tongue at first is white in the majority of instances, but becomes dark as the disease advances; there is also thirst, loss of appetite, diarrhœa, and pain in the abdomen.

About the seventh day an eruption appears on the abdomen and thorax, consisting of small pimples, which disappear on pressure. Bleeding from the nose is very common in this disease; hæmorrhage, also, from the bowels is of frequent occurrence.

Delirium increases as the disease advances, accompanied with a complete drowsiness; the face is swollen and of a Modena hue; the tongue becomes dry, cracked, and often bleeds; the teeth and gums are covered with sordes; the abdomen is swollen and tense; the pulse quick and tense. Irregular convulsive movements take place in the lips and the muscles of the face, while subsultus tendinum occurs in the wrists, producing the effect as if the patient was picking at something. One of the worst symptoms in the muscular apparatus is a rigidity of the muscles of the neck and limbs.

CAUSES.—*Predisposing.*—Debility, produced by fatigue, bad nourishment, spirituous potations, &c. It appears to depend

on some peculiarity of a country ; for it is often endemic, although not contagious. Age also gives a predisposition. According to Louis and Gerhard, the average age is 22 years.

Exciting.—Atmospheric changes of the spring and autumn appear to have but little agency in its production, but the heat of summer will develop the disease. Irregularity, exposure, excess, and mental disquietude appear to be the most usual causes.

DIAGNOSIS—*From Typhus.*—It is not produced by contagion ; unlike ordinary typhus, it is sporadic ; and when it has become epidemic, the peculiar symptoms are well marked, such as the papular measly eruption over the trunk and limbs, and by the presence of abdominal pain and tympanitis throughout the entire course of the affection. The prostration and somnolence, and the gradual appearance of nervous symptoms, are not so strongly marked as in typhus, but the pain in the head and disturbance of the senses are comparatively far more moderate.

PROGNOSIS—*Favorable.*—Refreshing sleep ; increasing slowness and softness of the pulse ; separation of the fur covering the tongue ; diminution of the heat of the surface ; an increasing facility of comprehension ; return of appetite ; alvine evacuations less fluid and less offensive ; muscles restored to their normal and steady condition.

Unfavorable.—Rapid and feeble pulse ; cold sweats ; cold skin ; increased color in the cheeks, which become of a dark purple ; continued and increasing delirium ; jactitation ; rigidity of the muscles following is to be regarded as a fatal symptom ; shrunken and pinched expression of the countenance, known as the *facies Hippocratica*. During the progress of the disease, a sudden appearance of peritonitis denotes an ulceration and perforation of the intestines, when there occurs a sudden pain and tenderness over the abdomen, with vomiting, coldness of the surface, and other evidences of rapid sinking : such symptoms mark a decidedly fatal termination.

Morbid Appearances.—The glands of Peyer are found in a morbid condition, and are either thickened, softened, or ulcerated, especially those in the neighborhood of the cæcum. Some of these glands are of a yellowish white color, while their consistence is changed to a friable substance ; others are ulcerated, having the appearance of a honey-comb. The cellular tissue, mucous and muscular coats, are rarely found without some trace of disease, while in many cases they are destroyed, and perforations are found in the peritoneum. Purple and slate-colored eschars are found whenever resolution has taken place. According to the descriptions of Cruveilhier, the spleen in almost every case has been found enlarged. In a few cases Brunner's glands are also affected.

TREATMENT.—Typhoid fever, or dothineritis, appears to be a peculiar disease, having, like small-pox and other eruptive disorders, a determinate course, requiring a certain number of days to pass through its stages. It is, therefore, useless to attempt any thing more than to mitigate its violence, and to be ready to meet violent local symptoms when they arrive. In the Massachusetts General Hospital, 36 cases occurred in 1837, every one of which recovered under a mild palliative treatment, apparently running its course like an ordinary eruptive fever. The early use of evacuating remedies, according to the experience of Dr. Jackson, is attended with far better success than when these means are deferred.

An emetic, followed by a mild cathartic, should be given in the commencement of the attack ; after the operation of which, restored quietude should be strictly imposed. Lemonade, acidulated barley or rice water, or soda water, should form the principal drink, if there is no diarrhœa present ; and when there is febrile action, the acetate of ammonia, with the sweet spirits of nitre, will be the best diaphoretic. If diarrhœa should exist, these remedies must be withheld, and chalk mixture with opium used to restrain it.

In some instances, it may be necessary to use bleeding, either local or general, according to the urgency of the symptoms and the constitution of the patient.

When symptoms of severe prostration occur, with small and feeble pulse, and coldness of the skin, wine and other stimulants are indicated.

In convalescence, the return to ordinary diet should be gradual, and the effects carefully watched, commencing with a milk diet, and followed by some weak animal broth. If the latter should not be followed by an increase of heat or headache, it may be succeeded by solid animal food, cautiously given.

TYPHUS SYNCOPALIS—SPOTTED FEVER.

This variety of adynamic fever was first noticed in New England in the year 1806. It has since prevailed as an epidemic in various parts of Massachusetts and Connecticut, and many cases of it appeared in New York, New Jersey, and Pennsylvania. It is remarkable for its sudden fatality ; death being preceded by the appearance of purple spots on the skin, caused by effused blood beneath the epidermis, whence its distinctive name is derived. ✓

SYMPTOMS.—Extreme prostration and weariness, sinking sensation at the stomach, small and frequent pulse, cold skin, pain in the head, coma and delirium, often attended with convulsions ; vomiting ; effusion of blood in spots beneath the epidermis in many cases. This latter symptom did not appear

in every case, nor was it constant in every epidemic. Death usually took place in from twelve to forty-eight hours.

CAUSES.—Cold and damp weather, depressing passions, and other agents producing debility.

POST-MORTEM APPEARANCES.—The petechiæ in most instances cover the whole part of the body, but diminish after death in the most prominent parts. The muscles are darker than usual; the veins of the brain are distended with blood; inflammation of the brain and adhesions between the membranes; traces of inflammation are also found in the thorax.

TREATMENT.—The most powerful stimulants were resorted to in the management of this affection, from the extreme prostration which attended its invasion. This course was particularly recommended by Drs. Miner and Tully as the only one which afforded any chance of recovery. Opium was freely given by these practitioners, and regarded by them as the remedy which alone could cure the disease. On the other hand, Dr. Gallup asserts, that of eighty-one cases treated without opium, but one died. The disease being in the first stage and of a congestive nature, or of sudden prostration of nervous energy from the effects of some unknown specific cause similar to miasma, a combination of stimulating and evacuant remedies is indicated. These are by no means incompatible. Most diseases arising from contagion or miasma exhibit a depression of the vital powers on the first invasion, where mild stimulants are needed, while blood-letting is demanded on the establishment of reaction. The abstraction of a small quantity of blood may ever be needed before the appearance of symptoms of reaction. While stimulant remedies, applied both externally and internally, are employed to excite the heart, a vein may advantageously be opened in the arm to excite the flow of blood through the veins; blood-letting, thus used, becomes a stimulant. Wherever the circulation is oppressed, neither stimulants nor evacuants should be relied upon singly, but a judicious and cautious combination of the two employed to excite the circulation. The principal object will be to excite reaction; when this is established, the general principles for the treatment of ordinary fever will then be indicated.]

FEBRIS INTERMITTENS—INTERMITTENT FEVER, OR AGUE.

GENERIC CHARACTER.—A fever consisting of paroxysms or periods of fever, between each of which there is a perfect intermission or period without fever.

The chief varieties of intermittent fever are, 1. The *Quotidian*, in which a paroxysm occurs every 24 hours. 2. The *Tertian*, 48 hours. 3. The *Quartan*, 72 hours.

Other varieties of less importance are, 1. The *double Tertian*, in which a paroxysm occurs every day, those of the alternate days being of equal duration and intensity. 2. The *triple Tertian*, in which two paroxysms occur on one day, and only one on the other. 3. The *duplicated Tertian*, which returns twice on each alternate day. 4. The *double Quartan*, in which a paroxysm occurs on the day succeeding that of the regular quartan, so that there is a perfect intermission only on the third day. 5. The *duplicated Quartan*, in which two paroxysms occur on the day of attack, with two days of intermission. 6. The *triple Quartan*, in which a slight paroxysm occurs on each of the usual days of intermission. These forms of ague, as well as those which have longer intervals, and are called *erratics*, require the same treatment as the three primary types.

The paroxysm consists of three stages, which in by far the majority of cases follow each other with much regularity ; a cold, hot, and sweating stage. The time intervening from the commencement of one paroxysm to that of the next is called the *interval*, and that which elapses between the cessation of one paroxysm and the beginning of the next is called the *intermission*.

SYMPTOMS—Of the cold Stage.—Languor and sense of debility ; listlessness ; yawning and stretching ; an aversion to motion ; pallor of the face and extremities ; shrinking of the features ; the bulk of every external part is diminished, and the skin over the whole body appears constricted, as if cold had been applied to it. Sensibility is greatly impaired ; the secretions and excretions are diminished ; the urine is scanty, pale, and limpid ; the pulse is small, frequent, and irregular ; and the respiration short and anxious. There is more or less headache, and blueness of the fingers and toes. At length the patient feels a sensation of cold, first arising in the back, and thence diffusing itself over different parts of the body, though sometimes it is confined to a particular part, as to the extremities, side of the head, &c. This is succeeded by rigors, which terminate in universal and convulsive shaking.

Of the hot Stage.—After a longer or shorter continuance of shaking, the heat of the body gradually returns ; at first, irregularly, by transient flushes ; soon, however, succeeded by a steady, dry, and burning heat, rising much above the natural standard. The skin, before pale and constricted, is now swollen, tense, and red, and possesses an unusual tenderness and soreness to the touch. The sensibility, which in the cold stage was diminished, now becomes preternaturally acute ; pains arise in the head, and flying pains are felt over different parts of the body. The pulse is quick, strong, and

hard ; the tongue white ; there is great thirst ; the urine is high colored.

Of the sweating Stage.—At length a moisture is observed to break out upon the face and neck, which, extending, soon becomes a universal and equable perspiration. The heat now descends to its usual standard ; the pulse is diminished in frequency, and becomes full and free ; the urine deposits a sediment ; the bowels are no longer constipated ; respiration is free and full ; and all the functions are restored to their natural order.

After a specific interval, the paroxysm again returns, commencing as above described.

Pathology.—During the cold stage the blood leaves the capillaries of the surface of the body, and accumulates in the deep-seated large vessels ; there is congestion in the head, chest, and abdomen ; and the vascular spongy organs, especially the spleen, liver, and lungs, if predisposed to disease, are liable to suffer. Accordingly, few persons, in whom the disease has lasted for any length of time, entirely escape those local complications, especially enlargement of the liver and spleen. This view of the pathology of ague has led Dr. Mackintosh to employ venesection in the cold stage, to relieve visceral congestion, and, consequently, to free the heart and brain from oppression, to enable the system to rally, and either to stop the cold fit at once, or to induce reaction. This rational treatment is justified by the experience of Dr. Mackintosh, and of many other observers.

Comparative Frequency of the different Types, &c.—According to the observations of M. Andral in 1821, of fifty-six cases twenty-eight presented the quotidian or double tertian type, nineteen the tertian, seven the quartan, and one was erratic.

The frequency of the disease in different seasons, and the relative susceptibility of different ages to it, may be inferred from the following results : in January, February, and March, nine cases occurred ; in April, May, and June, ten ; in July, August, and September, seventeen ; and in October, November, and December, twenty : in all, fifty-six.

Ages of patients : at fifteen years, 4 ; from sixteen to twenty, 5 ; twenty to twenty-five, 19 ; twenty-five to thirty, 14 ; thirty to thirty-five, 6 ; thirty-five to forty, 1 ; forty to forty-five, 0 ; forty-five to fifty, 5 ; fifty to fifty-five, 1 ; fifty-five to sixty, 1 ; sixty-one, 1 ; and sixty-eight, 1.

From this statement it would appear that ague does not occur at an earlier age than fifteen years ; such, however, is not the case, as instances of the disease occurring as early as three years are on record.

The tertian type generally occurs in spring, and commences at noon ; the usual duration of the fit is ten hours. The quartan is more severe, occurs in autumn, and its fit begins in general in the afternoon : duration usually about six hours. The quotidian occurs in the morning, and most readily changes into the continued or remittent : usual duration about sixteen hours. The quartan has the longest cold stage, the tertian the longest hot stage.

The type changes after some time, tertians and quartans becoming quotidians, and quotidians becoming remittents, and occasionally ending in continued or typhus fever.

CAUSES—1. *Predisposing*.—Debility, however induced ; by a watery, poor diet ; great fatigue ; long watching ; grief ; anxiety ; the suppression of accustomed evacuations ; the repulsion of eruptions ; preceding disease ; a former attack of ague ; cold, united with moisture, in whatever way applied to the body.

2. *Exciting*.—Marsh miasma, or the effluvia arising from stagnant water or marshy ground, impregnated with vegetable matter in a state of putrefactive decomposition.

This is not, however, the only cause ; for of the fifty-six patients treated by M. Andral, a very small number had been exposed to marsh miasmata ; and in some who had been in marshy districts, the disease did not occur for some weeks afterward. Most of the patients resided in damp situations. The fever was induced in several by want, fatigue, and exposure to cold and wet ; and in some no assignable cause could be discovered. These observations are confirmed by the experience of practitioners in this country.

PROGNOSIS—*Favorable*.—When the paroxysms are of short duration, when they are regular in their recurrence, and leave the intervals quite free. *Unfavorable*.—The disease proving obstinate, and the paroxysms anticipating the usual time of their return ; a feverish state during the intermission ; manifesting a tendency to a continued form of fever ; the paroxysms being of long continuance, violent, and attended with much anxiety and delirium ; the disease being combined with others ; or other diseases being induced by a protracted state of the original intermittent. Those of most common occurrence are dysentery, cholera, enlargement of the liver and spleen, ultimately inducing dropsy and jaundice ; swelling of the tonsils and glands ; convulsions occurring during the paroxysm, preceded by great coma ; obstinate costiveness ; hiccough, with vomiting and pain upon pressure in the hypochondriac and epigastric regions ; depraved sense, as double vision ; great prostration of strength ; vertigo ; dry, black tongue ; and fetid excretions.

TREATMENT.

In the Paroxysm.

Indications.—1. During the cold stage, to endeavor to induce the hot. 2. During the hot stage, to promote perspiration. 3. During the sweating stage, to avoid checking the perspiration.

1. The *first indication* (for the treatment of the *cold fit*) requires artificial warmth; the pediluvium; fomentations to the feet; the warm bath; dry heat applied to the pit of the stomach, abdomen, along the spine, and to the hands and feet; warm diluent liquids; and cordial diaphoretics.

Other remedies have been administered either during the cold fit or immediately before it. *Bleeding* has been recommended and much practiced by Dr. Mackintosh. The cases in which it is indicated are plethoric patients, or those in whom there is great congestion of the internal viscera, especially of the brain. *Emetics* given before the fit have sometimes prevented its occurrence; and administered during the cold fit, they hasten the approach of the hot fit. A full dose of *laudanum* may be employed with much advantage before the paroxysm, or at the commencement of the cold fit. A favorite combination is one drachm of laudanum and one drachm of sulphuric æther.

2. The *second indication* (that of promoting perspiration) will be best fulfilled by those remedies which lower arterial action. The remedies employed in the treatment of the first stage should be laid aside, and cool air, cooling drinks, cold spunging, depressants, local or general blood-letting, should be resorted to, according to the urgency of the symptoms. Local complications must be treated in the same manner as common inflammation of the parts affected.

3. In the *sweating stage* the patient must be kept cool, wiped dry after it is over, and his clothes changed. He should then be allowed to sleep. When there is much debility, stimulants, as warm brandy or wine and water.

In the Intermission.

Indications.—1. To excite a new action in the system by certain remedies administered at the commencement, or immediately before the accession of the cold fit, and thereby to destroy the morbid concatenation induced by the cause of the disease. 2. To prevent the return of the paroxysm by invigorating the body.

1. The *first indication* is answered by emetics, by æther, or by opium, or by the two latter combined.

In the beginning of these, as well as of other fevers, it is

necessary to clear the bowels; and the best time to do this is during the intermission; any common aperient may be administered, in combination with some preparation of mercury.

The *emetic* should be administered so that its operation may commence just at the accession of the fit. Opium may be given in the form of tincture alone, or in combination with spirits of sulphuric æther, one drachm of each, about half an hour before the commencement of the cold stage.

Bleeding, as has been already stated, has been recommended for the purpose of preventing the approaching paroxysm, and thus putting a stop to the disease. If used with this view, it should be employed immediately before the accession of the paroxysm.

2. For the fulfillment of the *second indication*, recourse must be had to a nutritive diet; regular exercise, if the state of the patient render its use practicable; and one of those remedies which experience has shown to possess the power of preventing the return of intermittent paroxysms. These belong, for the most part, to the order of tonics, of which quinine and arsenic are the most powerful and efficient.

Bark, or its active principle, *quinine*, is the staple remedy for the cure of ague, and other intermittent disorders. The sulphate of quinine may be given in doses of two grains or more, every two, three, or four hours during the intermission. Larger doses are rarely required, but ℥j., ʒss., or even more, has been administered with impunity. Where there is much nervous irritability, it may be advantageously combined with opium.

[It not unfrequently happens that the disease is protracted after the use of sulphate of quinine or other tonics, from not previously preparing the system for its use by giving either an emetic or some gentle cathartic. Where the quinine fails to produce its febrifuge effects, it is probably owing to the neglect of such measures. Quinine has at times been given in enormously large doses, a practice of great hazard; several instances are on record of violent symptoms, and even death, being thus produced. The external application of quinine has been found efficacious where the stomach has not been able to tolerate it. Two scruples of sulphate of quinine, mixed with two ounces of simple cerate, may be rubbed in the arm-pits and groin three times a day.]

Arsenic is a remedy of equal power with *quinine*, but it requires to be used with greater caution. It may be given in doses of five drops of Fowler's solution, gradually increased to twelve or more, either alone or in combination with laudanum, every four hours during the period of intermission. Its effects must be carefully watched.

Sulphate of zinc, piperin, or the active principle of pepper, salicin, or the active principle of the willow bark, and a great variety of remedies belonging to the class of bitters and tonics have been used, and apparently with success. A cure, also, has been effected by the power of imagination, or by a sudden shock to the mind. In obstinate cases, change of air is the last remedy.

Diseases occurring in persons who have been exposed to malaria are very liable to assume the intermittent form, and they are of common occurrence in those who suffer from local disease brought on by continued attacks of ague. These are called masked intermittents. They require a combination of remedies appropriate to the local affection with those which have been mentioned as curing ague. Neuralgia is the most common form which these diseases assume.

Sequelæ of Intermittent Fever.—Diseases of the spleen and liver are the most common consequences of ague. The treatment required for these affections is change of air, local depletion often repeated, and, in the case of the liver, a course of gentle mercurial preparations, or the nitro-muriatic acid. Much benefit is often derived from a course of the Cheltenham or Harrogate waters. Counter-irritation by blisters or setons is often beneficial in these cases.

The symptoms of ague are sometimes of the most severe and alarming kind. The congestion in the first stage is extreme, leading to severe head or abdominal symptoms, and the reaction in the second stage is accompanied by local inflammation of equal severity. These cases of ague resemble synocha in its most severe form. In broken constitutions, on the other hand, ague may sometimes take a typhoid character (the malignant ague of authors), and run first into remittent, and then into continued fever, differing in no respect from typhus. The treatment applicable to such cases is the same as for continued fever of like severity and similar character.

FEBRIS REMITTENS—REMITTENT FEVER.

CHARACTER.—A fever arising from the same *causes* as the intermittent; but in which, although evident and distinct exacerbations and remissions can be perceived, there is no complete interval or apyrexia, one exacerbation appearing not entirely to go off before a fresh attack ensues. Remittent fevers rarely occur in these climates, but are very common in tropical countries; and, from their frequent complication with derangement of the liver, are denominated Bilious Remittents.

The *symptoms* vary according to the situation and constitution of the patient and the season of the year. Sometimes they are those pointing out a redundancy of bile; sometimes the nervous are most prevalent; at others the putrid.

The protraction of the exacerbations generally arises from some cause which keeps up an irritation in the system, and thereby prevents the disease assuming its regular form; or it depends upon fever of another type having been accidentally superinduced.

The *prognosis* will be drawn from the presence or absence of those circumstances which indicate danger in that particular form of fever which the disease assumes, and which are pointed out under the heads of the different species of typhus, synochia, or synochus. In warm climates it is often fatal.

The *treatment* will entirely depend upon the concomitant fever or other cause which prevents the state of apyrexia, and gives to the disease the remitting form. Should it have a tendency to either of the preceding genera, the treatment will be such as is there laid down; if it depend upon some cause of irritation, as diseased viscera, this is to be removed by the appropriate means elsewhere enumerated.

This disease is seldom observed in this country; but is of frequent occurrence in Philadelphia, according to Dr. Dewees (*Practice of Physic*, 1830). He is a strong advocate for venæsection during the paroxysm, when the pulse and other symptoms require it. A mild form of this disease attacks delicate persons in the autumn, and is usually preceded by irregular action of the digestive organs, dyspepsia, flatulence, abdominal tension, or diarrhœa. It is called gastric fever by Professor Frank. The ordinary causes of fever induce it, as cold, damp, fatigue.

SYMPTOMS.—The patient complains of languor, lassitude, or drowsiness; has alternate chills and flushes, but no perspiration; skin hot and dry; thirst, nausea, or a total loss of appetite. The fever increases in the evening. Sometimes, however, the exacerbation or increase of fever occurs at noon, and sometimes in the middle of the night. When the disease is left to itself, it causes determination of blood to the viscera of the head, chest, and abdomen.

[*Morbid Appearances.*—In numerous dissections made in the city of New York by Dr. J. A. Swett, the liver was found slightly changed in color, being somewhat darker than natural, a little softened in its texture, and of a natural size. There was neither lymph nor pus, nor any evidence of inflammatory action; and the changes observed in it were doubtless produced by the action of bile. The glands of Peyer were likewise free from any marks of inflammation, and of a white color. The spleen has been found enlarged and softened, and the mucous membrane of the stomach and duodenum in many instances inflamed, a condition often noticed in most acute diseases.]

TREATMENT.—That appropriate to continued fever of the same degree of severity. But when the intermission is well marked, and of some continuance, quinine or arsenic may be given, as in ague.

[The indications in the treatment are to allay the febrile action, to remove the irritating contents of the bowels, consisting of altered secretions, to relieve the gastro-intestinal irritation, and to restore the healthy action to the liver.

These indications are to be fulfilled by cool drinks, mild cathartics, and a general antiphlogistic course. Ice, and iced water, or soda water, when there exists much gastric irritation. Topical depletion, when the symptoms are violent, is of great importance in a disease so liable to congestion, and so frequently attended with debility as the one in question. In some epidemics, especially in the southwestern part of the United States, quinine is given in large quantities in the interval of the paroxysms, and even through all the stages of the disease, by Drs. Wharton and Parry. The same course has been pursued by Dr. F. U. Johnson in the New York Hospital.]

SYNOCHUS ICTERODES—YELLOW FEVER.

Synonyms.—Typhus icterodes, bilious remitting fever, Balam fever, mal de Siam, vomito-negro, vomito-prieto, coup de Barre, &c.

GENERIC CHARACTER.—Yellowness of the skin, partial or general, and, toward the fatal termination, vomiting of a black or dark-brown fluid, are frequent, *though by no means constant* occurrences.—*Gillkrest*. The disease assumes, in different epidemics, and often in the same epidemic, the several types of continued, remittent, and intermittent fever, and appears in every degree of severity, from simple ephemeral fever up to the worst form of typhus.

SYMPTOMS.—Weakness; lassitude; weariness; restlessness; frequent chills; faintness; nausea; acute pains in the back and limbs; pains in the head and eyeballs; the eyes injected and brilliant; sighing; mouth clammy; tongue generally furred at the center, and red at the tip and edges; pulse frequent, full, and hard; skin hot, dry, and harsh; there is great tenderness of the epigastrium, with extreme irritability of the stomach, and vomiting of the ingesta mixed with a glairy fluid. The bowels are confined, and the evacuations often clay-colored. The urine is occasionally tinged with bile.

After these symptoms have continued from forty-eight to seventy-two hours, they are succeeded by increased debility; a small and frequent pulse; a cold and clammy skin; a shrinking of the features; a dry tongue, covered with a brown or black fur; increased tenderness of the epigastrium, with an

acid burning sensation in the stomach, extending to the gullet, with extreme irritability of the stomach, and vomiting of all ingesta.

After a further interval of twenty-four or forty-eight hours, and sometimes earlier, the more characteristic symptoms make their appearance. Yellowness of the skin, beginning in the trunk, and extending rapidly to the whole body; yellowness of the conjunctiva; a feeble, irregular, and intermittent pulse; the tongue and teeth incrustated with black sordes; hæmorrhage from the mouth, ears, nostrils, or bowels; incessant hiccough; black vomit; dark and gelatinous stools; death, preceded by the symptoms of the last stage of typhus.

Such is the usual course of this disease. But the symptoms are subject to so much variation in different countries, in different epidemics, and even in the same epidemic, that no general description can comprise all the particulars.

[Yellow fever presents itself in different places and at different periods, with a considerable diversity of symptoms, and demanding a corresponding change in the treatment. The varieties, however, may be comprised under three different forms: the inflammatory, the typhoid, and the congestive. In the first-mentioned, inflammatory action occurs very shortly after the first invasion of the disease, with excessive violence, accompanied by pain in the head, stomach, and præcordial anxiety, and the usual symptoms of inflammatory fever. This form attacks the plethoric and robust, and at times with such violence as to terminate fatally within twenty-four hours; usually, however, from three to five days.

The second form of disease is known by the longer continuance of the stage of depression, vertigo, dimness of sight, and confusion of intellect. The skin is moist and soft, while in the former variety it is dry and harsh. It is characterized throughout by the usual symptoms of adynamic fever.

The congestive, or malignant form, is marked by the entire absence of reaction, and the almost complete absence of pain, with the exception of the gastric distress, which is common to every form of this disease. The patient lies dull and comatose, with the eyes suffused and loaded with blood, exhibiting a drunken aspect; the countenance is dull and destitute of expression; the skin is cool, and of an ash-color; the breath is cold, and singularly free from any offensive odor; the tongue is swollen, smooth, and red; the vomiting sets in quite early; the stools are light-colored; the urine suppressed.]

Sequelæ.—Organic diseases of the lungs, liver, spleen, or other internal viscera.

CAUSES.—Predisposing.—Hot climate; the climate of the West Indies, Spain, Gibraltar, America, and parts of Africa;

hot, dry, and sultry weather; male sex; intemperance; depressing passions of the mind.

Exciting.—Marsh miasma? The type of the disease is sometimes that of a remittent, tending to become continued in the worst cases, and distinctly intermittent in more favorable ones. From its tendency to assume the typhoid form, it has been named typhus icterodes.

Morbid Appearances.—General yellowness of the skin, sometimes interspersed with blue or livid spots; the brain and its membranes generally natural in appearance, and rarely presenting any unusual effusion of serum or blood; red, livid, or dark black spots and patches on the mucous membrane of the stomach, and its cavity filled with an inky black fluid (black vomit). The intestinal mucous membrane is often of a brown or blackish color in certain parts, but not ulcerated as in typhus fever; and the intestinal canal contains portions of the same black fluid; the bladder is contracted and sometimes inflamed. In some epidemics there has been effusion of blood into the structure of the muscles.

DIAGNOSIS.—In mild cases not always distinguishable from ephemeral or mild continued fever. In severe cases, the intense pains in the back and limbs, and in the eyeballs; the extreme restlessness, and incessant jactitation; the intense redness of the eyes; the pasty covering, with red tip and border of the tongue, are mentioned as characteristic of the disease. In more advanced stages, the yellowness of the skin and eye, and the black vomit.

PROGNOSIS.—Favorable.—A regular and steady pulse, a soft and warm skin, a natural expression of countenance, a moist tongue, a free discharge of urine, a distinct remission, natural sleep of some hours' duration, undisturbed by vomiting, a miliary eruption on the skin.

Unfavorable.—The early occurrence of any of the characteristic symptoms of the disease, as of yellowness of the skin, especially if it occur in patches; or of the black vomit. The existence, in an extreme degree of severity, of any of the leading symptoms, as the aching of the eyeballs; the pain in the back; the tenderness in the epigastrium; the acrid burning sensation in the stomach and œsophagus; the incessant vomiting; deep sighing; and singultus. Collapse; extreme coldness of the surface, with a sensation of internal heat; an irregular or intermittent pulse; and all the symptoms which are regarded as unfavorable in typhus fever. Instances of recovery are recorded after the appearance of the most unfavorable symptoms; and, on the other hand, "it is known that in persons sitting up in bed amusing themselves, and apparently in a favorable state, the black vomit has suddenly appeared,

quickly followed by death, to the utter astonishment of the medical attendants."—*Gillkrest*.

MORTALITY.—Very different in different epidemics. The deaths, in various instances, have amounted to 130 or 131 in 134; 19 in 20; 34 in 35; 1265 in 1739; 6684 in 16,517. The mortality is generally greatest when the epidemic is recent, and diminishes considerably in the course of time.

[The mortality of yellow fever is very great at the commencement of the epidemic, but as the disease spreads the proportion of deaths greatly decrease. Dr. Peter S. Townsend furnishes the statistics of this disease as it occurred in New York, by which it appears that of 161 cases there were 5 between the ages of 1 and 10; 17 between 10 and 20; 40 between 20 and 30; 40 between 30 and 40; 36 between 40 and 50; 15 between 50 and 60; 6 between 60 and 70; 2 between 80 and 90. Fifty-nine of these were females, among whom the mortality was as one to three. Six only were colored persons.]

TREATMENT—Indications.—I. To induce as speedily as possible, mercurial salivation. II. To insure the free action of the bowels. III. To relieve existing symptoms.

I. The balance of authority is in favor of the administration of large doses of calomel. Five grains, ten grains, or a scruple, should be given every two hours, until the gums are affected. Mercurial inunction may also be used in severe cases. The calomel should be administered in a small quantity of gruel or arrow-root.

II. The free exhibition of purgatives in this fever is indispensably necessary. They ought to be repeated, and, if necessary, assisted with clysters until they have produced at least five or six copious evacuations. The thorough evacuation of the whole of the intestinal canal during the first two hours of the fever can not be too much insisted on.

The best aperient is croton oil, in the dose of one, two, or three drops, repeated, if necessary, and administered at intervals throughout the disease, unless contra-indicated by extreme collapse. This remedy is strongly recommended by **Mr. Hacket**.

The stomach should be also unloaded at the commencement of the attack by an emetic of sulphate of zinc, in the dose of ʒi. or ʒss.

III. When the *skin* is hot and dry, cold affusion, or cold spunging, may be used with great advantage. When, on the contrary, there is great coldness of surface, the warm bath, at a temperature of 100° or more, and warm frictions, should be employed. *Local determination of blood* may be met by cautious local depletion, or by counter-irritation. The *sickness* may be

met by the constant administration of small quantities of arrow-root, or other demulcent fluids. Blisters to the entire length of the spine have, in the experience of Mr. Linton, been most effectual in removing this distressing symptom. The *pain in the eyeballs and forehead* may be relieved by local application of cold to the head. *Hæmorrhages* require the use of the mineral acids with bitter infusions. Collapse must be treated by diffusible stimulants, and the other remedies mentioned under typhus gravior.

Much difference of opinion has prevailed, and continues to exist, as to the real nature of this disease, and the treatment which ought to be adopted. The greatest weight of authority is in favor of the administration of large doses of calomel; for instance, from five to ten grains every two hours, accompanied with mercurial inunction, with a view not merely of unloading the bowels, but of affecting the system. Most authors who have tried this plan agree in stating that when salivation takes place the patient is safe. Emetics have also been strongly recommended at the outset of the disease. Dr. Stevens asserts that saline medicines are the only valuable remedy in this fever. He states that the mortality was immense at Trinidad before his arrival, but never so since. Mr. Hacket, on the other side, denies the efficacy of saline medicines, and insists strongly on the superiority of croton oil, which, in spite of the extreme irritability of the stomach, seems to be easily retained, and to act most beneficially.

An emetic at the onset of the fever, followed by croton oil as a purgative, and that by calomel in large and repeated doses, with cold affusion in cases of strong vascular excitement, seem to constitute the most important items of the treatment. But much must depend upon the severity of the epidemic, the character of the patient's constitution, and the symptoms present in the individual case. The practitioner must be prepared to encounter fevers of every type and every degree of severity in the same epidemic.—(See Gillkrest on Yellow Fever, Cyc. Pr. Med., vol. ii.)

[One of the best things to counteract vomiting is lime-water and milk, mixed in equal quantities, of which a table-spoonful may be given every half hour. A blister over the stomach is an indispensable measure where there is much gastric irritation.

From the extreme irritability of the stomach, and the great difficulty of controlling the vomiting when once established, it is evident that an emetic would scarcely be considered good practice by the judicious physician.

The indications in the first-mentioned variety, viz., the inflammatory, are to subdue inflammatory action, and to sustain

the system when this is subdued, and to prevent its sinking into a state of collapse. Bleeding, and evacuations from the bowels by means of calomel, followed by castor oil, are the best remedies for effecting the first indication. Bleeding was a favorite remedy with Dr. Rush, and which he carried to a great extent. Enormous amounts of blood have been taken by Sir W. Barnett, in the British fleet in the Mediterranean, with great success. The difference of views as to the necessity of blood-letting can only be reconciled by the fact that the yellow fever manifests, like other epidemics, different trains of symptoms at different periods and in different countries. During the epidemic of 1822, in New York, it was rarely the case that a patient required even a small bleeding after reaction became established. In the same year, at Norfolk, in Virginia, Dr. Archer found that, after bleeding and a full dose of calomel and jalap, a free diaphoresis ensued. It is necessary, therefore, to be guided altogether by the degree of inflammatory action manifested by the disease in deciding upon the use of so powerful an agent as blood-letting.

In the adynamic or typhoid variety, a mildly stimulating course must be resorted to, while pediluvium and warm spunging the body are used as auxiliary measures. In typhoid conditions in any disease, it is always a good practice to add stimulant applications to the surface of the body to the internal administration of stimulants, the latter greatly assisting in rendering the former more diffusive in its effects. The general principles of managing a typhoid or congestive fever need not be departed from in managing a similar condition in yellow fever.]

CHAPTER II.

FEBRIS INFANTUM REMITTENS Infantile Remittent Fever.

FEBRIS HECTICA Hectic Fever.

FEBRES PUERPERALES Puerperal Fevers.

FEBRIS INFANTUM REMITTENS—INFANTILE REMITTENT FEVER.

SYNONYMS.—Infantile gastric remittent, infantile hectic, worm fever, mesenteric fever, stomach fever, low fever of children, marasmus.

SYMPTOMS.—Pallor, languor, drowsiness, and chilliness in the morning; flushed cheek, hot skin, restlessness, and the general symptoms of fever toward evening; followed at night by profuse sweating, and toward morning by a distinct remission. Skin dry; tongue moist, but coated; pulse frequent; appetite variable and capricious, or altogether wanting; urine

scanty and high-colored, and deposits a whitish sediment; bowels costive or relaxed, or both alternately; the evacuations slimy, highly offensive, dark, green, pitchy, or clay-colored, with little or no bile, or with an abundant secretion of yellow bile; the abdomen tumid, and often hot to the touch; the breath offensive; the skin extremely irritable, so that the child is constantly picking the nose, lips, corner of the eyes, fingers, and anus.

Such are the symptoms of a well-marked case of infantile remittent fever in its acute form. When less severe, the remittent character of the fever is less strongly marked; the chilliness and languor of the morning and the febrile exacerbation of the evening being very indistinct, and the child merely looking pale and listless, and losing its appetite. Sometimes the disease becomes chronic, and is marked by paroxysms less intense, but of longer duration, the abdomen becomes harder and more tumid, the tongue more loaded, the constipation generally present in the acute form is changed for a constant and distressing diarrhœa, the little patient wastes rapidly away, until at length the plump and rosy features of the child are changed to the meager aspect of shrivelled old age. The more the child wastes away, the more restless and irritable does it become, till the last stage of debility arrives, when it lies in a state of total unconsciousness, and at length dies from exhaustion. The disease may occur at any age from one or two years up to puberty.

COMPLICATIONS AND TERMINATIONS.—A dry cough, and, if tubercles exist in the lungs, phthisis; enlargement of the cervical glands; skin disease (stropulus); irritation of the brain, and sometimes hydrocephalus; dysentery, and tabes mesenterica.

POST-MORTEM APPEARANCES.—Inflammation, or ulceration of portions of the alimentary canal, especially of the small intestines. Enlargement, induration, or suppuration of the mesenteric glands. Traces of inflammation, and its consequences in the brain or lungs.

DIAGNOSIS.—From hydrocephalus, by the patient being easily roused from stupor, if it exist; by the absence of strabismus and convulsions; by the want of distention in the veins of the scalp, and the want of prominence in the fontanelles; by the absence of extreme heat of the head, and the greater frequency of the respiration. In hydrocephalus, too, the bowels are more obstinately confined, and the urine more apt to be suppressed.

PROGNOSIS.—Generally favorable. There is hope to the very last. In the ascertained absence of hydrocephalus, and of extensive disease of the mesenteric glands, the practitioner may safely hold out a prospect of recovery.

CAUSES—*Predisposing*.—All causes of debility, as bad air, deficient food, &c.

Exciting.—Irritation of the mucous membrane of the intestinal canal by accumulated fæces, or improper diet; worms (the symptoms in this case are generally less strongly marked); diarrhœa; teething.

TREATMENT—*Indications*.—I. To remove all causes of irritation from the stomach and bowels. II. To support the patient's strength. III. To subdue local inflammation and remove local irritation.

I. The first indication is answered by (*a*) strict regulation of the diet; (*b*) the continued use of purgative medicines.

(*a*) *Diet*.—As long as vomiting or diarrhœa is present, a strict farinaceous diet should be prescribed, or farinaceous food made with milk, as milk gruel, arrow-root, or sago. In the absence of diarrhœa, rice milk or bread pudding, and, in cases of extreme debility, light animal broths or jellies may be prescribed. In young children no animal food should be allowed. In children of one or two years of age a still stricter diet is often necessary, and the quantity as well as the quality of the diet must be carefully regulated. At this early age the stomach is apt to be peculiarly irritable, and to reject even the simplest farinaceous food. In such cases, give a large table-spoonful of new milk from the cow every half hour or hour. This simple and natural diet has restored many a child despaired of by those who think it necessary to give medicine in all diseases. The stomach wants rest, and the patient wastes away because it is not allowed to rest: it rejects food in ordinary quantity, and will bear none in any quantity but that which is natural to it at that early age.

(*b*) *Purgatives*.—When the bowels are costive, purgatives must be administered day after day, till the patient recovers. As the evacuations improve in character, the symptoms also improve, and when the bowels are restored to their natural state, the patient is well; so entirely does this disease depend upon the state of the first passages. The choice of the purgative is not very important. A combination of one or two grains of calomel, with four or five grains of rhubarb or jalap, may be given every night, or every other night, followed the next morning by a full dose of castor oil. The calomel may be persevered in for weeks without bad effects, and, in by far the majority of cases, with no fear of salivation. It is not necessary to produce violent action of the bowels; one or two motions a day will be enough, and hypercatharsis must be carefully avoided. If there is obstinate constipation, however, there is no fear of giving large doses of calomel, and repeating them at short intervals. If diarrhœa exists at the outset,

it may generally be removed in one or two days by the diet prescribed : if the diet is not sufficient, a single grain of hydrargyrum c. cretâ, with three or four grains of the pulvis cretæ comp. c. opio, given three times a day, will soon succeed in removing it. When the diarrhœa has ceased, but never before, purgatives may be resorted to, and continued every night, or every alternate night, followed by the castor oil in the morning, until the patient is entirely recovered.

II. The patient's strength rarely requires support ; pure air, proper exercise, and a nourishing and unirritating diet are the best restoratives. The proper ventilation of the bed-room or nursery is of the first importance. Should *tonics* appear necessary, the steel wine, in doses of a tea or dessert spoonful three times a day, according to the age, or quinine in doses of from one to two grains, or the tonic infusions, will answer our purpose.

III. Depletion is rarely required in any form of infantile fever. If the brain, however, is much affected, the head hot, and the patient very restless, one or two leeches, or more, according to the age, may be applied, but they are employed much more frequently than they are required. Cold to the head will generally suffice to subdue any inflammation that may be present. If the child is teething, the gums must be well lanced ; if there are worms, they will be removed by the common purgatives already recommended ; if there should be any irritation in the lungs, accompanied by mucus in the bronchial tubes, tartar-emetic, in doses of $\frac{1}{10}$ to $\frac{1}{6}$ of a grain, may be given according to the age, in combination with one or two grains of hyd. c. cretâ, three or four times a day ; if the disease is complicated with dysentery, clysters of gruel may be frequently used ; if the belly is very hard and tumid, with enlargement of the mesenteric glands, much good may be derived from repeated friction with the hand or with a flannel moistened with olive-oil ; if the cervical glands are enlarged, they may be covered with a small piece of the emplastrum hydrargyri c. ammoniac. This simple application is to be preferred to the tincture of iodine.

Tabes mesenterica requires the same treatment as the infantile fever, of which it is a frequent consequence. Strict diet, purgatives if there is no diarrhœa, emollient clysters, frequent frictions to the abdomen, and tonics when they do not displace these more important remedies, constitute the treatment.

[The remittent form of fever is easily excited in children from irritating causes, either from teething or from the presence of indigestible food in the stomach. The treatment should, therefore, vary according to the cause producing the

affection. The abdominal viscera being those most deranged, the use of mercury as a prompt cathartic can scarcely be dispensed with; for there exists no article of the *materia medica* which exerts so general an action on the digestive organs, and which is so often followed by an improvement in the secretory functions. The use of this remedy is clearly indicated at the commencement, when the premonitory symptoms, those of irregularity of the bowels, or total failure of the appetite, and a fœtid state of the breath, show an altered and morbid state of the secretions.]

FEBRIS HECTICA—HECTIC FEVER.

CHARACTER.—This fever is, in almost every instance, a symptomatic affection. It differs from a continued, an intermittent, and a remittent fever; yet in some respects it resembles each, and approaches most to the last.

SYMPTOMS.—These present themselves in obvious exacerbations, beginning with a sense of chilliness, which is succeeded by an increase of heat and an accelerated pulse, and these are followed by perspiration. There are two exacerbations in the twenty-four hours. The first occurs generally about noon, and abates mostly in from four to five hours: this remission is but of short duration; a more violent exacerbation soon follows, which keeps increasing in violence until morning, when, about two o'clock, a perspiration breaks out that resolves the paroxysm.

The pulse during the exacerbations is generally quick and frequent, ranging from 96 to 130, or even more; the urine is high colored, and deposits a lateritious sediment: the cheeks are flushed, and have a florid, circumscribed redness; there is burning heat in the palms of the hands and soles of the feet; in the periods of remission, the pulse is mostly reduced in frequency, but seldom so low as in health: the appetite is not much impaired; tongue clean, moist, and red.

From the commencement of this fever the body wastes away, and in the advanced stage the emaciation is very considerable indeed.

At length the fever becomes more continued, and the exacerbations more violent; the appetite falls off; colliquative sweats alternate with diarrhœa; the facies Hippocratica makes its appearance, and under an increased severity of these symptoms, and those of the disease which causes the hectic fever, the patient sinks.

DIAGNOSIS.—This fever may be confounded with simple idiopathic remittent fever, but the existence of local irritation constitutes the point of difference.

PROGNOSIS.—Dependent upon the local disease of which it is the effect and symptom.

CAUSES.—This fever is generally supposed to arise from the formation of matter, or its absorption from large surfaces, as in suppuration of the lungs, liver, hip joint, &c. But it may arise from any local irritation in debilitated constitutions, even when no suppuration exists. The infantile fever which arises in weakened constitutions from irritation of the alimentary canal, is but one form of hectic; and the disease is often present in the early stage of phthisis pulmonalis, before there is any reason to believe that suppuration has taken place. It is in advanced stages of this disease that hectic fever is developed in its most characteristic form.

TREATMENT.—This must depend on the disease of which the hectic fever is symptomatic. If debility is the cause, or there is no apparent disease to produce the hectic symptoms, the medical treatment must be very similar to that of an ague, with a vegetable and milk diet. A course of sarsaparilla, with a mild or vegetable diet, now and then removes a hectic fever, the cause of which is not apparent. Quinine often does good. In colliquative diarrhœa, the sulphate of copper with opium is the best remedy.—(See Diarrhœa.)

FEBRES PUERPERALES—PUERPERAL FEVERS.

Under this designation authors have described several forms of disease, differing in many of their characters, but agreeing in the general feature of combining a well-marked febrile affection with a local disease, varying in seat, character, and intensity. The following distinct forms are recognized by authors:

1. ACUTE PUERPERAL PERITONITIS.
2. ADYNAMIC, OR MALIGNANT PUERPERAL FEVER.
3. PUERPERAL INTESTINAL IRRITATION.
4. FALSE PERITONITIS.
5. MILK FEVER.

ACUTE PUERPERAL PERITONITIS.

SYMPTOMS.—Severe rigor, commencing on the second, third, or fourth day after delivery, and in some cases much later; followed by acute pain in the abdomen, and generally in the hypogastric region. The pain is constant, augmented at intervals, increased by pressure and by motion, and accompanied by fullness and tension of the abdomen. The secretions, especially the milk and lochia, are checked; the skin is hot; the pulse sometimes frequent, small, and wiry, at others full and bounding; the tongue furred. There is headache, restlessness, and sleeplessness, with anxious and suffused coun-

tenance, occasional vomiting, and hurried respiration. In unfavorable cases the pain and tension of the abdomen increase, and it feels hard and tympanitic; the pulse becomes more and more rapid, the skin cold and clammy, the head first feels confused, and then muttering delirium follows; the tongue becomes dry and brown, the teeth covered with sordes; distressing eructation and vomiting, hiccough, subsultus tendinum, facies Hippocratica, and cold extremities usher in the fatal result.

Morbid Appearances.—Redness of the peritoneum, especially of that covering the uterus and its appendages, or lymph effused into its cavity. The uterus, ovaries, and Fallopian tubes covered with a creamy matter. Purulent deposits sometimes found in the muscular structure of the uterus; ovaries often disorganized.

CAUSES.—Contagion. The common causes of inflammation. It is often epidemic, and coexists with or precedes the malignant variety.

PROGNOSIS.—*Favorable*, but guarded, if the treatment is commenced early, and if the reigning epidemic is of a mild character.

TREATMENT—Indications.—I. To reduce inflammatory action. II. To remove local irritation.

I. Prompt treatment is required. Bleeding in the erect or semi-erect posture, to the approach of syncope, or leeches in large numbers to the abdomen, according to the severity of the symptoms and the strength of the patient; and to be repeated, if necessary; hot fomentations to the abdomen; calomel in doses of five grains every two, three, or four hours, with opium, or Dover's powder, continued till salivation takes place. Cooling drinks, and cool air. When there is much debility, nourishing food and stimulants, as wine, brandy, and ammonia, or turpentine, taken by the mouth, and in the form of injection.

II. A purgative of castor oil, or salts and senna, to be administered at the outset, and to be followed up at short intervals, so as to keep the bowels open. Warm water injections thrown up into the rectum and vagina.

If swelling, tension, and tenderness of the abdomen continue after the antiphlogistic remedies have been carried to their full extent, a blister may be applied to the abdomen, and dressed with mercurial ointment, or the abdomen may be fomented with hot turpentine.

ADYNAMIC, OR MALIGNANT PUERPERAL FEVER.

SYMPTOMS.—More obscure than the foregoing: the rigor less strongly marked, the pain in the abdomen less severe,

little increased by pressure, deeper seated, more circumscribed, and often limited to the hypogastric or iliac regions. The pulse, from the first, extremely small, rapid, and weak, ranging from 130 to 160; countenance anxious and sunk, skin of a livid yellow tinge; extreme restlessness; intellect, though sometimes clear to the last, generally wandering; low, muttering delirium; tongue at first white, then dirty yellow, then dry and brown; if blood is taken, its color is dark, and the coagulum very loose; eructation, vomiting, hiccough, diarrhœa; the evacuations highly offensive; lochial discharges fetid and often suppressed; breasts flaccid; abdomen tumid and tympanitic. Death after the usual typhoid symptoms, or slow recovery.

Morbid Appearances.—Peritoneum of a dusky color, the effused fluid dirty, brown, often bloody, and very glutinous, and mixed with shreds of lymph. Fetid gas in the intestines. Uterus disorganized, softened, or gangrenous; ovaries broken down and reduced to a pulp. Pus in the veins of the uterus, in the joints; inflammation, and abscess of the cellular membrane of the leg, &c. In a few cases, a remarkable destruction of the eye.

CAUSE.—Contagion.

PROGNOSIS.—*Unfavorable* in all cases; chances of recovery slight.

TREATMENT—Indications.—I. To reduce local inflammation at the least sacrifice of strength. II. To remove local irritation. III. To support the patient's strength.

I. Blood-letting, if employed at all, must be used with great caution. The hand must be kept on the pulse, and the effect carefully noted. If the pulse increases in fullness and force after the abstraction of a small quantity of blood, it may be allowed to flow more freely. Calomel, in doses of from three to five grains, every two or three hours, with half a grain or a grain of opium; or calomel in combination with three or four grains of ipecacuanha, or equivalent doses of James's powder or tartarized antimony. Hot fomentations, hot turpentine, or blisters to the abdomen.

II. Purgatives, injections of warm water into the rectum and uterus.

III. Nourishing diet, ammonia, spirituous stimulants, oil of turpentine, &c.

PUERPERAL INTESTINAL IRRITATION.

SYMPTOMS.—General uneasiness, coming on at any period after delivery, if the bowels have been neglected; loss of appetite; tongue furred; chills alternating with flushes; headache; frequent pulse; abdomen large and rather tense; slight,

deep-seated pain, relieved by steady pressure; nausea and vomiting of a dark and offensive fluid; diarrhœa; evacuations dark, fetid, watery, or slimy; flatulence; fetor of breath. In unfavorable cases, the exacerbations of fever become more severe and of longer duration, and attended with extreme debility and despondency; there is the red tongue of acute gastric irritation; the mucous membrane of the tongue and mouth is often covered with aphthæ. The diarrhœa continuing and the strength diminishing, the febrile symptoms become more constant and severe, and the disease gradually assumes the shape of the malignant puerperal fever.

Morbid Appearances.—Generally none. Sometimes inflammation, with or without ulceration of the mucous membrane of the intestines. When the disease, toward its termination, assumes the form of the foregoing species, the morbid appearances are those proper to each species.

Prognosis.—Generally favorable, if promptly treated.

Treatment—*Indications.*—I. To remove the offending matter from the bowels. II. To support the strength.

I. The first indication is fulfilled by a full dose of calomel and opium, followed, after an interval of two or three hours, by castor oil or the senna draught. The effect on the bowels may be kept up by calomel in doses of from three to five grains every three or four hours, and enemata of warm water may be administered from time to time.

II. The second indication is fulfilled by the usual tonic or stimulating remedies, and nourishing diet.

If the disease runs into either of the foregoing, the remedies appropriate to those forms of the disease must be employed.

FALSE PERITONITIS.

Symptoms.—After a slight rigor, pain and tenderness of the abdomen, a slightly-coated tongue, a rapid and very compressible pulse; temperature of the skin but little increased; expression of the countenance free from anxiety; strength much less impaired than in the other forms. It is most apt to occur in delicate and nervous females, and after unusually severe after-pains, or the violent operation of a purgative.

Prognosis.—Favorable.

Diagnosis.—From true puerperal peritonitis by the symptoms, and by the unfavorable effect of blood-letting.

Treatment.—Fomentations, poultices, diaphoretics, and opiates, with an occasional mild laxative.

There is a form of puerperal fever of occasional occurrence, and characterized by symptoms similar to those of false peritonitis, but with the addition of profuse perspiration, and frequently of diarrhœa, with nervous excitement and violent pal-

pitations of the heart. This is called Hydrosis, or Hydrotic fever. The therapeutic indications are, I. To remove local irritation; and, II. To support the strength. For this latter purpose, quinine, or stimulants in combination with opium, may be employed.

MILK FEVER.

SYMPTOMS.—After well-marked rigor, occurring about the third day after delivery, great pain and throbbing in the head; intolerance of light and sound; flushed countenance; contracted pupils; conjunctiva injected; pulse frequent, full, and hard; skin hot and dry; thirst excessive; tongue dry and coated. If the symptoms are not speedily relieved, the secretion of milk is suppressed; the breasts become flaccid; the head symptoms more severe; and delirium sets in.

CAUSES.—Heated atmosphere, undue exertion, mental agitation.

DIAGNOSIS.—From other fevers occurring in puerperal women by the great disturbance of the circulation, with the strong determination to the head.

Indications.—I. To reduce arterial action. II. To promote the secretion of the milk.

I. Arterial action may be subdued in slight cases by purgatives, with salines and tartar-emetic in small doses, by antiphlogistic diet, rest of mind and body, cool air, and warm diluent drinks. In more severe cases, blood-letting in a full stream, and repeated if necessary, followed by tartar-emetic in full doses, and brisk mercurial purgatives. Cupping, or leeches to the temples, and cold lotions or ice to the head, according to the severity of the head-symptoms. Hot water to the feet, and, in severe cases, mustard poultices to the legs.

II. To fulfill the second indication, the milk should be gently drawn off, and the breast be fomented or poulticed. The child should also be occasionally applied to the breast, with a view of re-exciting the secretion. (See article Puerperal Fevers, in Lib. of Pr. Med., by Dr. Latham; also, Dr. Ferguson's recent work on Puerperal Fever.)

GENERAL OBSERVATIONS ON PUERPERAL FEVER.

The diseases which are usually characterized by the term Puerperal Fever are the two first of the present group—acute puerperal peritonitis, and adynamic, or malignant puerperal fever. Both these diseases have been observed in different epidemics; and cases of both forms occur in the same epidemic, just as continued fever, in one year, takes the shape of synocha, in another of typhus, while in a third cases of both are observed to occur at the same time. In the mode of

commencement, too, there is an analogy between puerperal fever and common continued fever. The first stage of congestion sometimes assumes so marked a character in both as to give the disease the name of *congestive*; in like manner, the stage of reaction may be so strongly marked as to gain for the fever the name of *inflammatory*; or the symptoms, from the first, may be accompanied by that extreme debility and nervous depression which is characteristic of the *typhoid* state. These strong analogies, added to the acknowledgedly contagious character of both diseases, lead to certain general views which have an important bearing on the treatment. It is only by recognizing in these different forms the same essential disease, varying with the season, and "epidemic constitution," on the one hand, and with individual peculiarities on the other, that the treatment of the disease can be conducted on rational and safe principles. In this disease, more than in most others, it will not do to treat a name, to place reliance upon any approved prescriptions, or to follow implicitly the experience of any single epidemic. Puerperal fever, like continued fever, must be treated on general principles; reaction must be brought about by prompt measures when congestion exists; inflammation must be subdued by depressing remedies, where the disease takes on the inflammatory character; local complication must be treated with as little expense of blood and strength as possible, and the strength must be carefully supported where the typhoid character prevails from the first, or supervenes in the course of the disease.

CHAPTER III.

EXANTHEMATA—ERUPTIVE FEVERS.

CHARACTER.

CONTAGIOUS diseases, attacking a person, for the most part, only once in his life, beginning with fever, and followed, after a short and nearly definite interval, by cutaneous eruptions.

GENERA.

VARIOLA	Small-pox.
VACCINA	Cow-pox.
VARICELLA	Chicken-pox.
RUBEOLA	Measles.
SCARLATINA	Scarlet Fever.
PESTIS	Plague.
ERYSIPELAS	Saint Anthony's Fire.
MILIARIA	Miliary Fever.

VARIOLA—SMALL-POX.

SPECIES.—1. Variola discreta, distinct small-pox ; 2. Variola confluenta, confluent small-pox ; 3. Modified small-pox.

VARIOLA DISCRETA—DISTINCT SMALL-POX.

SYMPTOMS.—The eruption of distinct small-pox is ushered in by rigors, lassitude, headache, severe pains and extreme weakness in the back and loins, nausea, vomiting, pain in the epigastrium upon pressure, disposition to drowsiness, occasionally coma ; and, in infants, by convulsions or epileptic fits. These symptoms are followed by fever of the inflammatory type, with frequent pulse, hot and dry skin, restlessness, diminished secretions, &c., continuing up to the period of the eruption, and generally suffering considerable abatement at that time.

At the end of *forty-eight hours* from the first occurrence of rigors, the eruption makes its appearance on the face and forehead in the form of minute papulæ, sensibly elevated above the surface of the skin.

During the *third*, or *third* and *fourth* days, it extends itself successively to the sides of the nose, chin, and upper lip, to the neck and wrists, and at length to the trunk, thighs, and the whole body.

About the *fifth*, a little vesicle, appearing depressed in the middle, containing a colorless fluid, and surrounded by an inflamed areola or margin, perfectly circular, may be observed on the top of each little point or pimple. The eruptive fever now undergoes a still further abatement, or entirely disappears.

About the *sixth*, the saliva becomes increased in quantity and viscid, at the same time that there is a degree of swelling of the throat, difficulty of deglutition, and hoarseness.

On the *eighth* day, the pustules are completely formed and spherical, or prominent, and appearing almost to terminate in a point ; the inflammatory areola attains its full size, and the contained matter has assumed the appearance of pus. The face swells ; and the swelling extending to the eyelids, these often become so much enlarged as to close the eyes. The mouth, nose, and fauces are also covered with pustules.

About the *tenth* or *eleventh* (the eighth or ninth from the appearance of the eruption), the inflammatory areola subsides, the contents of the vesicle have changed from a white to an opaque yellow, and a dark spot appears on each pustule. At this time the tumefaction of the face subsides, and the hands and feet begin to swell.

After the *eleventh* day, the pustules, from being smooth, become rough, break, and discharge their contents ; and these, drying on the surface, form a small crust. These crusts in a

short time fall off, and leave the part they covered of a dark brown color, which often remains for many days; and in cases where the pustules have been large, or late in becoming dry, there are permanent deep indentations of the skin. The swelling of the hands and feet gradually subsides, and about the seventeenth day the secondary fever disappears.

The time occupied by the change from papulæ to pustules is called the period of *maturation*. At different stages of this process, according to the amount of eruption, but generally toward the end of the period, *secondary fever* sets in, characterized by extreme restlessness, sleepless nights, a frequent and quick pulse, scanty and high-colored urine, and frequently by delirium, especially at night.

VARIOLA CONFLUENS.

CONFLUENT SMALL-POX—SYMPTOMS.—Both in its symptoms and progress the confluent kind differs materially from the distinct or benign. The eruptive fever is more intense, and increases from the first appearance of the eruption to the period of pustulation. The *secondary fever*, which accompanies the decline of the disorder, is also more intense, and often assumes the typhoid character. Coma and delirium are more frequent concomitants; severe diarrhœa is sometimes present, and profuse salivation is apt to occur.

The eruption is irregular in its appearance, and in the succession of its stages. It is usually preceded by an erythematous efflorescence upon the face, from which the pustules emerge on the second day in the form of small red points; many of which soon coalesce, and form clusters greatly resembling the measles. Maturation is more early; but the pustules do not retain their circular form, are of an irregular shape, often flattened, and appear like thin pellicles fixed upon the skin, and containing, instead of true pus, a brownish ichor; nor are they surrounded by an inflamed margin, the intermediate spaces between the clusters appearing pale and flaccid. The inflammation extends to the subjacent cellular membrane, and tends in severe cases to extensive sloughing. The swelling of the face and salivation commence earlier, and rise to a much greater height than in the distinct form of the disease. The fever, though it generally suffers a slight remission, does not cease upon the appearance of the eruption, and about the ninth day it suffers a remarkable exacerbation, and, in some instances, all the worst symptoms of typhus supervene; the eruption assumes a dark livid or black hue; petechiæ, and passive hæmorrhages, bloody urine, or dysentery make their appearance; there are coma, convulsions, sordes on the lips and teeth, and the patient is often carried off on the night of the

eleventh day from the commencement of the disease. Should recovery happen, the pits or scars will be much deeper than in the milder form.

CAUSES.—Variola is the effect of a specific contagion. It is produced either by subjecting the body to the effluvia arising from those who already labor under the disease, or by the introduction of a small quantity of the variolous matter into the system by inoculation.

PROGNOSIS.—Variola, in its regular and benign form, seldom proves fatal, unless in consequence of improper management; but it often leaves behind it a predisposition to inflammatory complaints, particularly to ophthalmia and visceral inflammation, more especially of the thorax; and it not unfrequently excites scrofula into action, which might otherwise have lain dormant in the system.

The circumstances which lead to the apprehension of danger are,

I. The appearance of symptoms announcing the approach of the confluent form of the disease, or the disease in its progress approaching to the malignant character before described; the fever assuming the form of typhus, and the pustules becoming flattened, livid, or interspersed with petechiæ.

II. A sudden disappearance of the eruption, subsidence of the swelling of the face or extremities, depression of the pustules, followed by great prostration of strength, universal pallor of the skin, great anxiety, oppression at the chest, syncope, convulsions, coma, or delirium.

III. Complications with visceral disease, as inflammatory affections of the brain, of the throat, larynx, or lungs, or of the alimentary canal, and suppurations in these viscera, or in the joints.

In general, the fate of the patient is determined in the interval between the eleventh and seventeenth day. The crisis of the secondary fever is usually accompanied with a diarrhœa, or sediment in the urine.

The disease is most dangerous to adults and pregnant women, and often proves fatal to the latter.

The sequelæ of small-pox often prove fatal. Among these are inflamed pustules, abscesses, superficial ulcers, boils, sloughing of the skin, erysipelas, suppuration of the joints, in the hip, &c.; ophthalmia, followed by blindness from opacity of the cornea; inflammation of the serous membranes of the chest and abdomen; development of tubercles in the lungs, laying the foundation of phthisis; mesenteric disease; and scrofula. During the period of convalescence, patients are often attacked with other prevalent diseases, as typhus fever, erysipelas, and hospital gangrene.

POST-MORTEM APPEARANCES.—On dissection, the trachea, bronchi, lungs, liver, stomach, and intestines are found covered with pustules; there are traces of local inflammation in various organs; the entire body runs rapidly into putrefaction.

DIAGNOSIS.—Difficult at the commencement of the disease. The suddenness of the attack, the intense pain and extreme debility of the back and loins, the severe headache, the sickness, the absence of the local affections of the other severe exanthemata, the prevalence of the disease at the time, and the exposure to contagion, afford a probability in favor of small-pox. The regular succession of appearances, and changes in the eruption afterward, render the distinction easy.

The distinct may be often distinguished from the confluent, before the eruption appears, by the mildness of its attack, by the synochal type of the fever, and by the absence of typhoid symptoms.

MORTALITY.—In those unprotected by vaccination or by previous attack, about 1 in 4 of patients attacked. Average of twenty-five years at the Small-pox Hospital prior to the introduction of vaccination, 32 per cent., or about one third; extremes in different epidemics, 15 per cent. and 42 per cent. *Proportion to total deaths from all causes prior to 1800, 16 per cent. Comparative mortality of the unprotected and of those protected by vaccination:* Period, the epidemic of 1838. Unprotected (all forms of the disease), 157 in 396, or 1 in 2.52; protected, 31 in 298, or 1 in 9.61. The natural small-pox, therefore, is nearly four times as fatal as the modified.—(Dr. Gregory.) *Mortality in the several forms of natural small-pox.*—Confluent, 1 in 2; semi-confluent, 1 in 10; distinct, 0 in 19. *Influence of age on the mortality from small-pox.*—From 0 to 5 years, 41.97 per cent.; 5 to 10, 24.24 per cent.; 10 to 15, 19.12 per cent.; 15 to 20, 24.10 per cent.; 20 to 30, 34.07 per cent.; 30 to 40, 46.54 per cent.; 40 to 50, 58.33 per cent.; 50 and upward, 79.41 per cent. (Period, 1780–99, and 1826–35, Mr. Farr, in Medical Annual.)

LAWS OF CONTAGION.—Communicated by contact or through the air, by the living and dead body, by the pustules, or by substances imbued with the variolous matter. Rarely occurs twice in the same person. Epidemic at certain seasons, as in 1781, 1796, 1825; and 1838.

PERIOD OF INCUBATION.—Usual duration, twelve days; limits, ten to sixteen days.—(Gregory's Lectures.)

TREATMENT.—In the first stage, *before the appearance of the eruptive fever*, the treatment will be the same, whatever may be the nature of the impending disease. An emetic, followed by purgatives, to remove any offending matter from the primæ viæ; bleeding in case of plethora, the antiphlogistic regi-

men in case of inflammatory symptoms, stimulants in extreme nervous depression. Opium in case of great nervous irritability. Bleeding and stimulants in congestion, in order to restore reaction, and to relieve the circulation.

During the eruptive fever, when this is of the inflammatory kind, the febrile symptoms, if considerable, are to be moderated by exposing the body of the patient to a cool atmosphere; by frequently administering cold diluent fluids, as lemonade, imperial, saline draughts, &c.; at the same time administering saline aperients, so as to keep the bowels loose. Cold affusion, also, may be employed with advantage when there is much heat of skin.

After the appearance of the eruption, the indications are :

I. To moderate the fever when violent. II. To support the strength when deficient. III. To subdue local inflammation and relieve occasional symptoms.

I. In full and plethoric habits, and in cases of violent action, bleeding has been recommended, but it should be avoided if possible; for the subsequent debility generally overbalances the temporary advantage that may be gained by this remedy. In place of bleeding, mercurial and saline aperients, tartar-emetic in doses proportioned to the amount of fever present, and the antiphlogistic regimen, and free ventilation of the patient's apartment, should be prescribed.

II. When the patient's strength fails, he must be supported by tonics or stimulants, according to the degree of the existing debility. Quinine, or the tonic infusions, may be prescribed in the less degrees of weakness, wine and ammonia when the debility is more considerable. If with the debility there is great irritability and restlessness, opium in small quantities, or its tincture, may be combined with the tonic or stimulant.

III. When the eyelids swell much, and are inflamed, a blister may be applied behind the ears, or leeches to the temples. In such cases, and when the face is swollen, olive oil or cream is often applied with advantage.

If the throat be much affected, and there is difficulty in swallowing, a blister is to be applied to the neck, and gargles of infusion of roses directed.

Determination to the head or chest, or other viscera, requires blisters, the pediluvium, sinapisms to the feet, and the ordinary remedies applicable to idiopathic inflammation.

Obstinate vomiting, which in this disease often proves both a troublesome and dangerous symptom, is most effectually allayed by saline remedies, in the act of effervescence, with opium.

If the febrile symptoms indicate a tendency to typhus, the

mode of treatment recommended for the milder form of typhus fever should be resorted to.

In all cases where there is a great propensity to sweating, after the eruptive fever has passed by, a cool regimen will be particularly necessary.

Diarrhœa, when excessive, is to be checked by small doses of opium with chalk mixture.

When the eruption suddenly recedes, or the pocks sink and become very much dimpled, and any alarming symptoms supervene—as rigors, convulsions, or delirium—recourse must be had to blisters and sinapisms, leeches to the temples, blisters to the nape of the neck, and sinapisms to the feet and legs. The cold dash applied to the head while the body is in a warm or vapor bath, may be used with great benefit.

Upon the accession of the secondary fever, if this preserve the character of synocha, and be not attended by extreme debility, recourse must be had to the antiphlogistic remedies recommended for the commencement of the disease.

If, on the contrary, the secondary fever be typhoid, the means recommended for the cure of typhus gravior must be enforced.

Several plans have been recommended for preventing the pitting of small-pox. All of them consist either in protecting the parts from the air, or in letting out the contents of the vesicles before they have changed from lymph to pus. Mercurial plasters applied in the early stage of the eruption have been used as a protection from the air. But the plan of puncturing the vesicles with a fine needle as soon as they are formed, and absorbing the matter with soft cotton, is to be preferred.

MODIFIED SMALL-POX.

SYMPTOMS.—Small-pox, modified by a previous attack of the disease, or by vaccination, differs in several respects from the disease as it occurs in unprotected persons. The principal points of distinction are the following: The eruptive fever, though often extremely intense, generally continues during only one day. The patient often complains of some indisposition in the afternoon, passes an extremely restless night, and finds the eruption out in the morning. The first places in which it makes its appearance are generally the wrist and alæ of the nose. A papula appearing in the latter situation will often give the first clew to the nature of the disease. The eruption itself runs a shorter course, is rarely confluent, and presents none of the uniformity of the regular disease. A few of the pustules are regularly formed, and present the central depression, but they are commonly smaller than in the un-

modified form. Several of the papulæ do not pass to the form of vesicle, and the vesicles die away without suppurating. All the stages of the eruption may be seen on the body at the same time, and all of them imperfect. As soon as the eruption appears, the patient is well, unless it happen to be sufficiently extensive to give rise to irritative fever.

DIAGNOSIS.—The short duration of the eruptive fever, the complete absence of secondary fever, except in extreme cases, and the rapid progress and irregular nature of the eruption. The discovery of a pustule presenting the distinct central depression is the only sure pathognomonic character of the disease.

PROGNOSIS.—*Favorable* in a large majority of cases.

TREATMENT.—The antiphlogistic regimen during the eruptive fever, followed by occasional aperients.

VACCINIA, VACCIOLA—COW-POX, KINE-POX, VACCINE DISEASE.

The benefits conferred on mankind by the discovery of vaccination, as a preventive of small-pox, are now universally admitted. If the virus be genuine and properly inserted by inoculation, the human body is, to a certain extent, protected from the attack of small-pox, and the disease, if it occur, is in most cases greatly mitigated. The protection seems, however, to be less effectual during severe epidemics, when the power of the contagion is at its height.

DESCRIPTION OF THE ERUPTION.

The vaccine lymph should be inserted under the cuticle, by three or four punctures, made near each other, in each arm. If the operation is properly performed, we observe on the *second* day small red spots which feel hard, but, when viewed through a microscope, are seen to be vesicular. On the *third* or *fourth* day the spots are larger and more perceptible, and on the *fifth* small pearly vesicles appear. These are surrounded by crimson or pink areolæ, but sometimes not before the *seventh* or *eighth* day, when they become circular or annular, and the efflorescence is about an inch in diameter. The surface of the vesicle is uneven; there is a depression in the center. On the *ninth* day the edges are elevated, and the rosy blush is increased, hard, and tumid. At this period, an erythema may extend over the arm, and sometimes over the whole body. About the *ninth* or *tenth* day the disease is at its height, and there is a slight degree of fever for a few hours. On the *eleventh* or *twelfth* day, the areola, or rosy blush, diminishes; the center of the vesicle is covered with a brown scab, which falls off in a few days, generally on the *twentieth*, leaving a deep mark, or indentation, on the skin, of a circular

form, about an inch in diameter, with as many pits as there were cells in the vesicle. Unless all these appearances are observed, a spurious cow-pox has been communicated, and **revaccination is absolutely necessary.**

The best time for taking the matter is from the fifth to the eighth day, and from that to the twelfth, but after this time it can not be depended on ; or if any cause, such as friction or injury, has disturbed the progress of the vesicle. The disease will not be properly communicated should there be a chronic eruption on the arms ; if scarlatina, measles, or other cutaneous diseases supervene ; or if dentition, disordered bowels, or any other malady be present at the time of inoculation.

Infants should be vaccinated after the sixth week. The only preparatory step to be taken is to open the bowels. There should be no cutaneous eruption on the arms, and no disease present at the time of vaccine inoculation. The best vaccinators prefer three or four slight punctures in each arm, and sometimes a single puncture in each ; while others make as many as thirty, and others prefer longitudinal scratches with a lancet. When many punctures are made, the arm becomes much inflamed, and sometimes ulcerates, giving rise to great constitutional irritation. Such a practice is cruel and unnecessary. Sometimes boils, pustules, leprous and impetiginous eruptions succeed the vaccine disease ; but this seldom happens when the child's health is good at the time of vaccination. Such eruptions are readily cured by mercurial alteratives and gentle aperients.

Some have recommended the repetition of vaccination at intervals of a few years. It is, perhaps, a wise precaution, and if adopted, should be performed a second time at about ten years of age, or from this to the age of puberty. As it may be practiced without inconvenience, it may be well to resort to it in epidemic years, whenever we are unusually anxious to insure protection against small-pox, or to allay the fears of timid persons.

[The best time for repeating vaccination is from the period of puberty to the age of twenty years. It is during this interval that the modified small-pox, or varioloid, appears to be most readily received. In some individuals, the susceptibility to the contagion of small-pox continues to a greater or less degree during life, notwithstanding the protecting powers of the kine-pock. As this susceptibility remains in many, it is the safest practice to repeat the operation of vaccination whenever small-pox prevails, and thus effectually guard against the danger of an attack of that disease. In no instance, according to the experience of the editor, has this course failed to protect

entire families, while a neglect of it has been in some cases followed by an attack of varioloid of great severity.]

As it is important at the present time that the amount of protection afforded by vaccination should be understood, the following tables have been constructed :

EPIDEMIC IN SCOTLAND, 1818-1819. DR. JOHN THOMPSON.

	Unprotected.	Small-pox second time.	Small-pox after vaccination.
Cases	205	71	310
Deaths	50	3	1
Proportion . . .	1 in 4	1 in 23	1 in 310

MARSEILLES.—EPIDEMIC OF 1828.—ESTIMATED POPULATION, 40,000.

	Unprotected.	Inoculated.	Vaccinated.
Estimated number	8000	2000	30,000
Attacked	4000	20	2000
Deaths	1000	4	20
Proportion of attacks to estimated number } . . .	1 in 2	1 in 100	1 in 15
Proportion of deaths to attacks } . . .	1 in 4	1 in 5	1 in 100

See Watson's Lectures on the Practice of Physic. Dr. Gregory (Lectures, p. 219) states that "small-pox in the unvaccinated is five times more fatal than it is to those who have previously undergone vaccination." According to the first of these tables, it is nearly eighty times, and according to the second, twenty-five times more fatal.

[From statistics carefully collected from the Orphan Asylums in New York, Philadelphia, and Baltimore, where great care is taken to have vaccination performed upon all the children that are received, it appears that nearly 16,000 children were vaccinated during a period of eight years. Of this number, there were but eight deaths from small-pox contagion up to the age of fourteen years, when the children are discharged.]

VARICELLA—THE CHICKEN-POX, SWINE-POX, BASTARD-POX, GLAND-POX.

SYMPTOMS.—Within twenty-four hours after slight symptoms of fever, as lassitude, loss of sleep, wandering pains, loss of appetite, &c., an eruption appears; first on the back, consisting of small reddish pimples, much resembling the first appearance of the small-pox. On the *second* day the red pimples have become small vesicles, containing a colorless fluid, and sometimes a yellowish transparent liquor. On the *third* the pustules arrive at their full maturity. Soon after, the fluid becomes extravasated by spontaneous or accidental rupture of the tender vesicle, and a thin scab is formed at the top of the pock, without pus ever being formed, as in the true variola.

Generally before the *fifth* day the whole eruption disappears, without leaving behind it any cicatrix or mark.

DIAGNOSIS.—*From Variola.*—By the small degree of fever ; by the short interval (twenty-four hours) between the first symptoms and the appearance of the eruption ; by the pimples first appearing on the back ; by no suppuration taking place ; by the absence of indentation ; by the pustules falling off in scales about the fifth day ; at which period the eruption in variola is only just completed. From modified small-pox, by the absence of pits in all the vesicles.

PROGNOSIS.—It is entirely free from danger, unless the eruption be of the confluent kind, when the danger may be judged of from the degree of violence of the concomitant fever.

TREATMENT.—This complaint is of so trivial a nature as seldom to require the aid of medicine. Gentle saline aperients are all that are in general necessary. Should there be accidentally much fever, the same means may be employed for moderating it that are recommended in small-pox.

MORBILLI OR RUBEOLA—THE MEASLES.

SPECIES.—1. *Rubeola vulgaris* ; 2. *Rubeola maligna*.

RUBEOLA VULGARIS.

SYMPTOMS.—The premonitory symptoms resemble an attack of catarrh. After rigors and flushes, lassitude, heaviness, pain in the head, and drowsiness, there are ringing cough ; hoarseness ; difficulty of breathing ; frequent sneezing ; itching of the face ; smarting of the eyes, swelling of the eyelids, copious secretion of watery fluids from the eyes and nostrils ; nausea or vomiting, thirst, furred tongue, frequent pulse, and the general symptoms of synocha.

On the *fourth* day small red points appear, first on the face, and afterward successively on the lower parts of the body. They are generally in crescentic clusters, do not rise into visible pimples, but by the touch are found to be a little prominent.

On the *fifth* or *sixth* day the vivid red is changed to a brownish hue, and in a day or two more the eruption entirely disappears, with a mealy or furfuraceous desquamation of the cuticle.

The febrile symptoms are not diminished upon the appearance of the eruption, but rather increase, and are attended with much anxiety and oppression of the præcordia, and symptoms of pneumonia. The fever, however, undergoes considerable abatement on the sixth or seventh day. At the period of desquamation of the papulae, a diarrhoea frequently comes on, and continues for some time.

The eruption may occur without catarrh (*rubeola sine catarrho*).

RUBEOLA MALIGNA.

This form of the disease is ushered in by more severe premonitory symptoms, and soon assumes the typhoid character. The eruption appears early, but irregularly; alternately receding and reappearing; it assumes a dark or livid hue (*rubeola nigra*), and is often interspersed with petechiæ. The fauces often assume a dusky red or livid hue; all the symptoms are aggravated; there is great tenderness in the abdomen, with dark, offensive stools; delirium is present, or coma, or convulsions; and the affection of the mucous membrane of the air-passages passes into croup or severe pneumonia. The patient dies exhausted by diarrhœa, or asphyxiated by the congestion of the lungs, or comatose from the severity of the head-affection.

CAUSE.—Specific contagion, of which patients are generally susceptible only once during their lives.

DIAGNOSIS.—The pathognomonic symptoms which distinguish the eruptive fever of measles from variola and other diseases, are the peculiar dry ringing cough and hoarseness; the heaviness of the head and drowsiness; sneezing; coryza; the appearance of the eyes, which are red, swelled, itchy, very sensible to light, and frequently loaded with tears. It is distinguished from *Scarlatina* by its darker hue, by the defined character and crescentic arrangement of the patches, by the marked catarrhal symptoms, and the absence of the severe affection of the throat: from *Roseola*, by the catarrhal symptoms, by the darker hue and more sudden appearance of the eruption, and by the greater severity of the symptoms.

PROGNOSIS.—*Favorable*. The febrile and other symptoms slight; moderate diarrhœa; early and free expectoration; a moisture on the skin at the appearance of the eruption.

Unfavorable.—A high degree of fever; hot and parched skin; hurried and difficult breathing; flushed countenance; unusually hard pulse.

The fever increasing after the appearance of the eruption, and assuming the form of typhus; great pain in the head and eyes; shooting pains in the chest; symptoms of pneumonia or cynanche; no expectoration before the fourth day; the pulse rapid and small; delirium or coma; extremely anxious respiration; continued diarrhœa or vomiting.

The sudden disappearance of the eruption, succeeded by delirium, great anxiety, laborious respiration, acute pains in the chest, or violent diarrhœa; the eruption becoming of a livid hue.

SEQUELÆ.—Pneumonia, cynanche trachealis, bronchitis, phthisis; diarrhœa, enlargement of the mesenteric glands; ophthalmia, abscesses in the ear, swelling and suppuration of the parotids; aphthæ and gangrene of the mucous membrane of the mouth.

PERIOD OF INCUBATION.—*Six to sixteen days.*

TREATMENT.

Of the Rubeola Vulgaris.

Indications.—I. To diminish the inflammatory action. II. To relieve urgent symptoms.

I. The first indication is fulfilled by abstinence from animal food, and strict adherence to the antiphlogistic diet; by placing the patient in a moderately cool atmosphere, the temperature of which should be regulated in a great measure by his own feelings, carefully guarding against any sudden change or exposure to severe cold; by the occasional exhibition of saline aperients, and by the common refrigerants and diaphoretics, of which tartar-emetic is the best.

When the febrile symptoms run high, and more especially when symptoms of local inflammation are present, recourse must be had to general and local bleeding, combined with tartar-emetic in nauseating doses.

II. If the disease be accompanied by inflammation of the lungs, general and topical blood-letting must be enforced; with tartar-emetic in full doses, and occasional purges, as recommended for the cure of idiopathic pneumonia. As ulceration or sloughing is apt to succeed vesication, blisters should be avoided.

Horseness, cough, and inflammation of the fauces will be palliated by barley-water, with acacia gum; thin arrow-root; orgeat and water; the compound decoction of barley, or capillaire and water, taken in very small quantities, and frequently, not cold, but with the chill just removed. The addition of a little nitre, or of a small quantity of lemon-juice, will render them more palatable. Inhaling the steam of warm water is also serviceable.

Mild opiates are occasionally useful after the febrile action is abated; but when given before, they neither procure rest, nor an abatement of the cough. An opiate, given at bedtime, should always be combined with a saline diaphoretic.

Where diarrhœa is excessive, astringents and opium are necessary. Should the diarrhœa continue, and threaten great exhaustion, recourse must be had to the opiate confection, astringent clysters, and the more powerful astringent remedies recommended in the treatment of diarrhœa.—See *Diarrhœa*.

When diarrhœa does not take place toward the resolution of the disease, a purge or two of the submuriate of mercury should be administered.

Of the Putrid or Malignant Species.

The treatment of malignant measles is similar to that of typhus fever: it requires the exhibition of mineral acids, quinine, wine, ammonia, &c., according to the degree of the existing debility. Delirium, pneumonic symptoms, cough, &c., must be treated as before recommended.

When the eruption of measles disappears before the proper period, and convulsions, or great anxiety, or delirium, take place, the indication will be to restore the eruption to the skin. To effect this, recourse must immediately be had to the warm bath, blisters or sinapisms to the chest and feet, the administration of warm wine and water, camphor and æther, or other appropriate stimulants.

When convalescence commences, the diet should be nutritious, the bowels regulated, the dress warm to prevent pulmonary inflammation, which is very apt to occur, and to lay the foundation of consumption.

SCARLATINA—SCARLET FEVER.

SPECIES.—1. *Scarlatina simplex*; 2. *Scarlatina anginosa*; 3. *Scarlatina maligna*.

SCARLATINA SIMPLEX.

SYMPTOMS.—After the usual premonitory symptoms of fever, viz., cold chills, shivering, nausea, and sometimes vomiting, with pain in the head, back, and limbs; thirst, hot skin, frequent pulse, and the other symptoms of synocha. On the *second* day, in the greater number of cases, a bright scarlet efflorescence is perceptible on the face, neck, and breast, whence it extends itself over the entire trunk and limbs. At first it consists of innumerable red points, separated by interstices of the natural color; these spots soon coalesce, so that in a few hours the redness becomes universal. The skin is rendered pale by pressure, but the color immediately returns. After the lapse of *one* or *two* days the efflorescence again becomes partial, is arranged in large irregular patches, and does not disappear on pressure. The skin is perceptibly rough to the touch, and in some instances it is studded with small miliary vesicles. The rash generally begins to decline on the *fifth* day, is very indistinct on the *sixth*, and wholly disappears by the *eighth* day. Desquamation of the cuticle generally begins on the parts first affected about the end of the *fifth* day, and soon extends to the entire body. The cuticle separates in the form of scurf on the trunk and limbs, and in large scales from the

hands and feet. The mucous membranes are more or less affected at the same time ; the eyelids, the lips, the edges of the tongue, the soft palate, the pharynx and nostrils, are of a bright red color ; the tonsils are slightly enlarged, and there is some difficulty in swallowing. The papillæ of the tongue are elongated, and project as bright red points through the white mucous which covers its surface ; or the whole tongue is of a bright-red color, with prominent papillæ. The appearance of the tongue in the first case bears a close resemblance to that of a white strawberry ; in the second, to that of the red variety. The febrile symptoms subside with the rash, leaving, in most cases, great debility behind them.

Although the eruption in scarlet fever usually occurs on the second day, there are many exceptions to the rule. During the prevalence of scarlet fever, cases are constantly occurring in which there is slight sore throat and a suspicious appearance of tongue, with little disturbance of health for three, four, or five days, at the end of which time the eruption makes its appearance, and the disease generally runs a mild course. I at first felt some difficulty in my prognosis in these cases, but I soon found that, however slight the other symptoms might be, there was always during this latent period a very frequent, full, and peculiarly compressible pulse. Wherever such a pulse exists, with suspicious symptoms, some febrile disease may be confidently looked for. On the other hand, there are cases in which the eruption makes its appearance much earlier, as in a young lad of sixteen, who felt ill for the first time at five o'clock in the evening, and had the eruption full out upon him before twelve o'clock at night. The case was intermediate in severity between scarlatina simplex and scarlatina anginosa.—(G.)

SCARLATINA ANGINOSA.

SYMPTOMS.—Lassitude ; dejection of mind ; pain in the head, followed by soreness, with sense of straightness in the muscles of the neck and shoulders ; rigor ; horror ; and other symptoms of typhous pyrexia.

On the *second* day, difficulty of swallowing ; hoarseness, loss of appetite ; nausea, and often vomiting ; hurried respiration, interrupted by frequent sighs ; the breath is hot and burning to the lips ; great thirst ; hot and dry skin, the temperature often rising to 106° , 108° , or 112° ; small pungent pains, as if occasioned by the point of a needle ; quick, weak sometimes hard pulse.

On the *third* day the face, neck, and breast appear redder than usual ; or scarlet stains, or patches, are observed about the mouth and nose ; the sub-maxillary glands are enlarged and painful to the touch ; the velum pendulum palati, the

uvula, the tonsils, and pharynx, as far as the eye can reach, partake of the general redness. Collections of thick mucus, and specks, are often observed, much resembling the sloughs in cynanche maligna; yet real ulceration seldom takes place. The papillæ of the tongue are elongated and elevated, the organ itself is very red, the inflammation may extend along the mucous membrane of the fauces, nostrils, and Eustachian tube, and be followed by purulent discharge from the nostrils and ears. The redness in a few hours becomes universal over the body, and increases to a great degree of intensity. It disappears upon pressure; is perfectly smooth to the touch; nor is there the least appearance of pimples or pustules.

On the *fifth* or *sixth* day the intense scarlet gradually abates; a brown color succeeds; when the skin, becoming rough, peels off in small scales, and the patient begins to recover strength and appetite. Not unfrequently, however, after a few days' amendment, an unaccountable languor and debility is felt; stiffness in the limbs; accelerated pulse; disturbed sleep; disrelish for food; scarcity of urine; dropsical swellings; sometimes anasarca alone; sometimes combined with ascites or hydro-thorax.

SCARLATINA MALIGNA.

Intense inflammation of throat at the outset of the disease, followed by extensive sloughing, and accompanied by great enlargement of all the salivary glands. The eruption appears late in the disease, in irregular patches, of a paler color, sometimes disappearing suddenly. The other symptoms are those of typhus in its worst form.

SEQUELÆ.—Anasarca; pain and swelling of the larger joints; scrofulous affections; discharge from the ears; supuration of the glands of the neck; inflammation of the eyes and eyelids; inflammatory affections of the internal viscera. The anasarca, which is the most formidable of the sequelæ of scarlet fever, often follows on the mildest attacks.

CÁUSE.—Specific contagion.

DIAGNOSIS.—*From Measles.*—By the absence of cough, sneezing, and coryza; by the affection of the throat; by the peculiar appearance of the tongue; by the appearance of the eruption, its greater extent, and its less defined form.

From Erysipelas.—See Erysipelas.

PROGNOSIS.—*Favorable.*—The concomitant fever purely inflammatory, and slight affection of the throat; remission of the febrile symptoms, and of the affection of the throat, upon the appearance of the eruption; hæmorrhage from the nose of a florid red color; diarrhœa, or other critical discharge.

In one case, I have known all the threatening symptoms

pass away, after a profuse discharge of mucus from the nostrils.—(G.)

Unfavorable.—The eruption being preceded by great anxiety, nausea, vomiting; the fauces of a dark red or purple color, without swelling; ash-colored or brown specks, soon becoming ulcerated, or terminating in gangrene (*cynanche maligna*); great prostration of strength; delirium; coma; the early or very late appearance of the eruption. Its coming out in patches is more unfavorable than a universal efflorescence; the fever continuing after the period of desquamation; glandular swellings; anxious difficulty of breathing, and peculiarly stridulous voice, indicating the extension of the disease to the larynx and trachea; acute pain in the ear, with deafness; the saliva tinged with blood of a dark color; discharge of acrid matter from the nose; running from the ears; skin continuing obstinately dry; the desquamation followed by a fresh efflorescence and increase of fever; diarrhœa, inflammation and suppuration of the parotid, sub-maxillary, salivary, and cervical glands; congestion or inflammation of the brain or lungs.

A favorable convalescence may be expected when the pulse falls much below its natural frequency in health; and a marked improvement is generally indicated by a fall of the pulse at night as compared with its frequency in the morning. A frequent pulse continuing when the urgent symptoms have subsided, would lead us to anticipate a lingering convalescence or the occurrence of secondary symptoms.—(G.)

Treatment of Scarlatina Simplex.

All that will, in general, be requisite in the treatment of scarlatina simplex in its mild form, is to keep the patient in a moderate and equable temperature, about 60° of Fahr.; to preserve the apartments clean and open; to enforce a light diet without animal food; to direct cooling acidulated liquors for common drink, and to administer gentle aperients, more particularly toward the decline of the eruption.

Treatment of Scarlatina Anginosa.

Indications.—I. To lower febrile action. II. To reduce the inflammation of the throat without exhausting the strength of the patient.

I. The first indication is fulfilled by the ordinary antiphlogistic treatment. When the heat of the body is much, and steadily, above the natural degree, the *cold affusion* may be employed, or the body may be frequently spunged. When this remedy is used with due precaution, it is attended with the best effects, and there is little fear of repressing the eruption.

II. Where severe inflammation of the throat is present, prompt remedies are necessary. General blood-letting should be avoided, unless there is very high febrile action; but local bleeding by leeches may be advantageously resorted to. Ice swallowed freely, and cold lotions or ice, applied externally to the throat, are the chief remedies. In employing them, we must take care that the heat of the body generally is not too much reduced. Used with this precaution, this local application of cold will not be found to interfere with the progress of the eruption, nor to be attended with any other risk. Where ice can not be procured, cold liquids must be substituted. Blisters, strong liq. ammoniæ, sinapisms, or hot turpentine, may be applied externally with some advantage. Acidulated gargles may be used to clear the throat of the tenacious mucus which is thrown out; but if ice can be procured, these are unnecessary.

At the decline of the eruption, tonics are required, especially quinine, cinchona, or cascarilla; a nutritious diet also, with wine.

Treatment of Scarlatina Maligna.

Scarlatina, which assumes the typhoid character, at whatever period it may happen, is a highly dangerous disease, and requires the employment of cordial tonics, acids, and wine, in large and repeated doses, as recommended for the cure of typhus gravior. When the throat is covered with sloughs, stimulating and astringent gargles must be used very often. Of these, the Cayenne-pepper gargle is the most efficacious. Gargles containing chlorine are also to be strongly recommended.

Children, sometimes, are with difficulty prevailed upon to gargle and take the medicines; in this case, the gargle may be injected into the nostrils.

Chlorate of potash (a drachm to a pint of water) has been strongly recommended as a drink in cases of severe scarlet fever.

When anasarea, ophthalmia, pneumonia, cerebral affections, or other diseases succeed scarlatina, they are to be treated on ordinary principles. Purgatives, tonics, nutritious diet, warm clothing, and cautious avoidance of exposure to cold or damp, must be employed and observed after recovery from this disease.

Sometimes scarlatina occurs without the eruption, but with the characteristic sore throat strongly marked. This usually happens in adults who have already had the disease in its complete form.

For an account of the dropsy, which is the most common sequel of scarlet fever, see Anasarea.

PESTIS—PLAGUE.

Definition.—"An exanthematous disease, the eruption consisting of buboes, carbuncles, and pustules, white, livid, or black, and generally attended with malignant and very fatal fever."

SYMPTOMS.—The patient is attacked suddenly, or after slight premonitory symptoms—consisting of rigors, lassitude, depression of spirits, pain and weight of head, and giddiness—with an indescribable feeling of anxiety about the præcordia, and extreme restlessness and severe pain referred to the region of the heart. The countenance is expressive of exhaustion and anxiety, the eye is dull and sleepy, the eyelids closed, the mouth half open. The gait becomes staggering and uncertain like that of a drunken man; the debility soon becomes extreme, the head falls upon the breast. The eyes become more dull and sunken, the complexion dingy; there is bilious vomiting; the tongue is swollen, furred, and glistening, but moist and clean toward the tip and edges; pulse from 115 to 130, and very feeble; respiration hurried; speech indistinct and faltering. Darting pains in the axillæ and groins now indicate the commencement of the characteristic glandular swellings and carbuncles. In favorable cases, these swellings are of a bright red color; in the more dangerous, livid or purple. This first stage, which commonly lasts twelve hours, is followed by reaction, with increased restlessness, disturbed sleep, confusion of thought alternating with coma; the countenance retains its former expression, but the eye assumes a peculiar brightness, and the pupil is dilated. The pulse is hard and full, or very infrequent, or weak, fluttering, and intermittent; the tongue is dry, parched, of a yellowish color, red in the center and at the edges; then brown, cleft, and horny; the lips, teeth, and nostrils coated with dry sordes; there is constant nausea, with occasional vomiting of a blackish fluid; the evacuations from the bowels dark and offensive, and occasionally mixed with grumous blood; and hæmorrhage sometimes takes place from the nose.

In favorable cases, the crisis is by profuse perspiration and suppuration of the tumors; but in unfavorable ones, the skin remains harsh and dry; the pulse is small and fluttering; low muttering delirium and laborious breathing set in; the eye is sunk, the countenance wears a ghastly expression, the skin becomes covered with petechiæ and vibices, the buboes remain stationary; the powers of life give way, and death takes place without a struggle.

CAUSE.—Contagion. This is doubted by some authorities. The disease is endemic in Egypt, often spreads to the sur-

rounding countries, and formerly prevailed in almost every part of Europe.

MORTALITY.—In Smyrna, during five months of 1834, out of 5727 persons attacked, 4831 died, and 907 recovered : 1 in 23 of the whole population suffered, and about 1 in 27 died ; the deaths constituting 84 per cent. of the cases.—(See Lib. and Cyclop. Pract. Med., Art. Plague.)

PROGNOSIS.—The most favorable cases are those in which the buboes form early, are firm and movable, and pass rapidly into suppuration. Profuse perspiration is one of the best symptoms, and often proves critical. An absence of severe fever, and the survival of the patient beyond eight days, also promise recovery.

The *treatment* is that of typhus fever, with appropriate local applications to the buboes and carbuncles. Mercury carried to salivation has been recommended, and, where salivation has taken place, seems to have been beneficial. The disease appears, however, to be almost equally fatal under all modes of treatment.

ERYSIPELAS—ST. ANTHONY'S FIRE.

SPECIES.—1. Idiopathic erysipelas. 2. Traumatic erysipelas.

IDIOPATHIC ERYSIPELAS.

SYMPTOMS.—The disease sets in with rigors, and other symptoms of pyrexia ; great confusion of the head, sometimes amounting to delirium or coma ; nausea, vomiting, and, sometimes, diarrhœa ; the tongue moist and covered with a uniform white fur ; and the pulse full, compressible, frequent, and quick. About the *second* or *third* day the skin of a particular part of the body becomes inflamed, and from this point an efflorescence of a florid red color spreads more or less rapidly, being bounded by a distinct margin elevated slightly above the level of the sound skin, and at length occupying a large extent of surface. There is considerable swelling, and a peculiar acrid heat of the inflamed parts ; when the face is the seat of the disease, the whole hairy scalp becomes affected, and the eyes are frequently closed by the swelling of the palpebræ ; as the redness extends, it disappears from, or gradually subsides in, the parts at first occupied. After a longer or shorter time the efflorescence terminates in the formation of vesicles of a larger or smaller size, or in desquamation of the cuticle. The fever rarely suffers a marked remission till the eruption has ceased to spread, when, in favorable cases, the patient rapidly regains his appetite and strength. In unfavorable cases the fever assumes the typhoid character, and the pa-

tient sinks comatose or exhausted on the ninth or eleventh day.

TERMINATIONS.—1. Resolution. 2. Vesication and desquamation of the cuticle. 3. Œdema (*erysipelas œdematodes*). 4. Inflammation of cellular membrane (*erysipelas phlegmonodes*), with consequent suppuration, or gangrene (*erysipelas gangrenosum*). 5. Metastasis to internal organs, especially to their serous investments. 6. The disease sometimes suddenly leaves one part of the surface, and attacks a distant part (*erysipelas erraticum*).

Parts affected by the Disease.—The face is the most common seat of idiopathic erysipelas. That which follows wounds (traumatic erysipelas) may occur on any part of the body. Erysipelas of the face commonly begins on the nose, and thence gradually extends over the entire face. Sometimes it descends and spreads over the neck and trunk, but more commonly attacks the scalp. In its passage over the head, the membranes of the brain are commonly more or less affected, and there is delirium of the violent or muttering kind, according as the accompanying fever is of the inflammatory or typhoid type; or coma. From the head it generally extends down the back, and sometimes affects the membranes of the spinal cord. In severe cases, traces of the affection of the membranes of the brain and spinal cord remain for some time after the recovery of the patient, and are shown by mental excitement, and by numbness and spasmodic twitchings of the extremities. Erysipelas of the head and face is generally accompanied by more or less inflammation and redness of the throat, and, in rare instances, it proves fatal by inducing serous effusion into the submucous tissue of the glottis and epiglottis.

CAUSES—*Predisposing.*—A full plethoric habit; constitutional peculiarity; previous affections of the same nature.

Exciting.—Cold; excessive heat, or vicissitudes of temperature; exposure to the rays of the sun; abuse of fermented liquors; suppressed evacuations, or other causes inducing plethora; the presence of irritating matter in the primæ viæ; more especially of acrid bile. Contagion; wounds or local inflammation of the common kind occurring in certain constitutions, in certain seasons, and in places where the disease already exists. It is often epidemic, most prevalent during spring and autumn, and frequently prevails in hospitals, jails, and other crowded situations. It is also a frequent concomitant of puerperal fever.

PROGNOSIS—*Favorable.*—The fever purely inflammatory; the eruption of a bright scarlet or red color; not extending over a large surface; no vesications: the fever and coma di-

minishing upon the appearance of the efflorescence ; and this, soon after, assuming a yellowish hue, with an abatement of the swelling.

Unfavorable.—The fever assuming the typhoid form ; its being protracted to the seventh, ninth, or eleventh day, with increase of coma, and delirium : the inflammation becoming of a dark rose-color ; its suddenly receding from the surface, and attacking an internal part ; its extending over a large surface without leaving the part it originally occupied ; livid vesications ; weak, rapid, irregular pulse ; great prostration of strength ; early coming on of coma ; the disease being epidemic ; the constitution of the patient originally weak, or emaciated by previous illness ; the disease being combined with dropsy, jaundice, or other affections originating in organic disease.

TREATMENT.—*Indications.*—I. To reduce the arterial action if the fever be of the inflammatory kind.

II. To support the strength of the patient if it assume the typhoid form.

III. To obviate the tendency to a determination to the head or other important organs.

IV. To subdue inflammation, and promote salutary changes in the part affected.

I. High action, if present, is to be reduced.

(a) By *Bleeding*.—This operation is, however, to be adopted with the greatest care, for it seldom happens that the fever is purely inflammatory, but mostly mixed, having strong synchial symptoms in the beginning, and running soon into typhoid. When, however, the subject is young, in the country, the constitution unimpaired, and the symptomatic fever high, the lancet may be resorted to with advantage ; on the other hand, in persons accustomed to the air and living of a large town, and more especially if the constitution has suffered, or is naturally weak, the abstraction of blood would favor the speedy change from an apparently inflammatory into a typhoid state of the febrile symptoms.

(b) By cooling or mercurial *purges*.—These are extremely serviceable ; the submuriate of mercury may be administered frequently in doses of from three to five grains, with rhubarb or any aperient. Calomel in small and repeated doses may be employed with advantage when there is biliary derangement.

(c) By nauseating *diaphoretics* : especially tartarized antimony.

(d) By cooling drinks and *dilutents* : as acidulated soda-water, lemonade, tamarind-water, and the like.

II. *To support the strength of the patient, if the disease assume the typhoid character*, recourse must be had to the remedies rec-

ommended in typhus, viz., stimulants, as wine and ammonia, and to the stronger stimulants in persons previously accustomed to their use. These may be combined with opium when the head is not affected.

The treatment of erysipelas will vary, therefore, according to the type of the fever with which it is attended. If it be well-marked synocha, which it seldom is, the usual means of diminishing inflammation are to be resorted to; and, above all others, the frequent exhibition of mercurial purges. If, on the contrary, it possesses the character of typhus, quinine, Peruvian bark, wine, and other remedies of the invigorating kind, enumerated under typhus, are to be relied on. If the patient is seen in an early stage, an emetic should be given, and followed by a brisk purgative.

III. In cases of head affection with coma and delirium, much relief will be afforded by the semicupium, together with the application of sinapisms to the feet, mustard pediluvia, or a blister between the shoulders. Diseases of other internal organs must be treated by the remedies applicable to similar idiopathic diseases, taking into account the patient's strength. When the eruption has disappeared from the surface, and attacked an internal part by *metastasis*, an attempt must be made to restore the inflammation of the skin by the prompt application of strong stimulants, as mustard poultices, acetum, cantharidis, or hot water.

IV. The topical applications resorted to by surgeons are various.

1. Warm fomentations, such as a decoction of poppy-heads.
2. Cold spirituous applications where the inflammatory action runs high.
3. Dry absorbent powders, as starch, meal, chalk, magnesia, litharge, to defend the part from the air, and to take up any acrimonious fluid that may be oozing out.

In phlegmonous erysipelas, the vessels may be relieved by leeches, by small punctures, or by moderate incisions. When gangrene has taken place, deep incisions are necessary, and we must use general and local stimulants, fermenting poultices, the chlorides of lime or soda, &c. Should suppuration occur, the abscess must be timely opened.

Erysipelas may sometimes be prevented from extending by applying nitrate of silver at a short distance from the margin of the inflamed part. [Nitrate of silver has caused a permanent discoloration of the skin, an important fact to recollect when the affection exists on the face.]

MILIARIA—MILIARY FEVER.

SYMPTOMS.—Oppression, and sense of tightness about the

præcordia ; the breathing laborious, and interrupted by frequent sighs, or a teasing cough ; rigors, extreme debility, and depression of spirits, followed by increased heat of surface, with wandering pains and restlessness. After these symptoms have continued for a variable period of from two to five or six days, a *profuse sweat*, of a sour, rank odor, makes its appearance, accompanied by a harassing pricking or itching of the skin. On an *uncertain day*, a number of small red papulæ, about the size of millet-seeds, are observed, first upon the neck and breast, and thence gradually extending to the trunk and extremities ; their prominence is imperceptible to the sight, yet evident to the touch ; they often lose their redness, and appear of the ordinary color of the skin. After *ten or twelve hours*, a small vesicle appears upon the top of each : this at first is of a whey color, but afterward becomes white. At other times the vesicles retain their red color, which has given rise to the division into the red and white eruptions ; they generally appear separately ; sometimes, however, they are intermixed ; in both, the matter contained in the vesicles has a peculiarly offensive smell. In *two or three days* the vesicles break, and are succeeded by small crusts, which fall off in scales ; or the disease terminates in resolution, or by desquamation. The febrile symptoms do not subside on the appearance of the eruption, but after a variable interval.

CAUSES.—*Predisposing*.—Lax habit of body ; sanguine temperament ; childhood ; the female sex ; the period of childbirth ; old age ; preceding attacks of the same disease ; debility, however induced ; excessive evacuations ; long-continued and copious menstruation ; fluor albus ; the presence of irritating matter in the primæ viæ ; abuse of tea drinking ?

Ecciting.—Immoderate sweating, produced by excessive heat, or by heating medicines. Too much bed-clothes and warmth in the puerperal state.

DIAGNOSIS.—The uncommon anxiety and dejection of mind ; the profuse sweating ; its peculiarly fetid, rank smell. Afterward, the appearance of the eruption.

PROGNOSIS.—*Favorable*.—The fever inclining more to the nature of synocha than typhus ; remission of the symptoms upon the appearance of the eruption ; the papulæ of a florid red color.

Unfavorable.—The sweating obstinately continuing after the eruption of the papulæ, with increase of fever ; great anxiety ; flaccidity of the parts covered by the eruption ; profound coma ; difficulty of breathing ; dejection of mind ; the sudden disappearance of the eruption, followed by great prostration of strength, anxiety, difficult respiration, violent vomiting, delirium, convulsions ; the appearance of petechiæ in-

terspersed among the papulæ ; rapid, weak, and intermitting pulse ; anasarca swellings.

TREATMENT—*Indications*.—I. To diminish the immoderate heat and sweating. II. To support the strength of the patient, where there are concomitant symptoms of great debility.

I. The first indication will be accomplished,

(a) By the cautious application of *cold* ; the air of the bedroom should be cool, part of the bed-clothes should be removed, and the patient should be desired to lie with the arms exposed.

(b) By gentle *aperients*, of which the milder mercurial preparations and the neutral salts are to be preferred.

(c) By mineral *acids* ; especially the sulphuric, which may be given in the infusion of roses, or with decoction of bark or quinine.

II. The second indication requires ammonia, or bark and wine ; and where there is great restlessness, opium.

Should a retrocession of the eruption take place, followed by the alarming symptoms above mentioned, musk, camphor, opium, blisters, and frictions to the skin ; endeavoring by every means to bring out and support a copious diaphoresis ; external warmth ; powerful diaphoretics, &c. The skin may be washed with a solution of chloride of lime.

There are other cutaneous eruptions of less moment, preceded by constitutional and febrile symptoms, which might have been treated in this place, but they are reserved for a future chapter.—(See Skin Diseases.)

CHAPTER IV.

PLETHORA Fullness of Blood.

ANÆMIA.

CACHEXIA Bad Habit of Body.

CHLOROSIS Green Sickness.

EFFECTS OF LOSS OF BLOOD.

MIMOSIS INQUIETA Nervous State.

PLETHORA—FULLNESS OF BLOOD.

Synonym.—General hyperæmia.

SYMPTOMS.—General aspect of the body, full and florid ; capillaries of the surface injected ; redness of the skin momentarily removed by pressure ; pulse frequent, full, firm, and bounding ; or infrequent, indistinct, and laboring ; or irregular in force and frequency, according to the degree in which the heart is oppressed ; tongue clean and red, or slightly fur-

red; appetite good, or, in extreme cases, variable; bowels generally confined; skin dry; extremities generally cold; palpitation and dyspnœa on exertion; frequent sighing; dull, heavy pain in the head; listlessness; debility.

PROGNOSIS.—Favorable.

TERMINATIONS.—In local inflammations and hæmorrhages; apoplexy; suppression of the menstrual discharge in females.

TREATMENT.—*Indication.*—To diminish the quantity of blood. To fulfill this indication, general blood-letting is required. The quantity taken must depend on the effect produced and the relief afforded. The system will often safely bear the removal of forty or fifty ounces or more. It should be taken from a small orifice in the semi-erect or recumbent posture. The pulse should be examined, to ascertain the effect produced. Where it is frequent, full, and bounding, blood may be abstracted till it falls to its natural frequency and force; if it is laboring, till it becomes full and free; if irregular, until it becomes regular. To prevent the rapid formation of fresh blood, a diet consisting chiefly of vegetables, with small quantities of animal food, and total abstinence from malt or spirituous liquors, must be enjoined. The bowels must be kept freely open by the compound rhubarb or aloetic pill at night, followed by saline aperients every morning, or twice or thrice daily.

If in females the disease is complicated with amenorrhœa, blood may be taken from the groin by leeches applied at the menstrual periods.

ANÆMIA.

The term anæmia is here used to designate a state of system dependent on a decrease in the quantity of the red particles and solid constituents of the blood.

SYMPTOMS.—Universal pallor of the skin, conjunctiva, gums, and lining membrane of the mouth; dead whiteness of the substance of the tongue; cold extremities; debility; palpitation and dyspnœa on the slightest exertion, accompanied by violent pulsation of the carotid arteries; faintings; headache, consisting generally in a fixed pain over the eyebrows or on the top of the head; pain under the left breast; pulse frequent, small, and quick, increased by exertion, and accompanied by violent throbbings of the carotid arteries and cerebral vessels, and easily accelerated by emotions of the mind; the patient is easily agitated by slight noises or unexpected events, and suffers from depression of spirits, and, in some cases, from hysteric fits; the secretions and excretions are generally scanty; and the bowels often torpid. On applying the stethoscope over the large veins of the neck, a humming sound is heard (the bruit de diable—humming top sound). In extreme cases, a bruit de

soufflet, bearing a strong resemblance to the puffing of a locomotive, is heard in the carotid arteries.

CAUSES.—Obscure. It is generally, but not always, associated with scanty menstruation or amenorrhœa; and it frequently precedes the first appearance of the menses.

PROGNOSIS.—Favorable.

DIAGNOSIS.—From the effects of loss of blood or other drains upon the system, by the history of the case. From chlorosis, by the absence of disorder in the functions of the alimentary canal.

TREATMENT.—*Indications*.—To promote the formation of the red particles by the use of iron. This should be given in full doses. The best preparation is the dried sulphate of iron, and the proper dose in well-marked cases of anæmia, five grains three times a day. An excellent combination consists of five grains of dried sulphate of iron, with an equal quantity of extract of gentian three times a day. If the skin has a tinge of yellow, and the secretions of the liver seem defective, one or two grains of hyd. c. cretâ may be combined with the steel and gentian with the best effect. If the bowels are torpid, the compound aloetic pill may be given every night, or as often as may be required.

Wherever the skin, gums, and tongue are pale, whatever may be the other symptoms present, steel may be safely given in full doses. I have administered it in five-grain doses three times a day, in a well-marked case of anæmia during the most severe and distressing headache, and with the carotid arteries pulsating violently, not only with safety, but with the most prompt and decided benefit. I know of no remedy upon which such uniform dependence can be placed.—(G.)

CACHEXIA—BAD HABIT OF BODY.

SYMPTOMS.—The skin sallow and dusky, harsh and dry; countenance generally emaciated; the pulse frequent, small, and compressible; the tongue clean, moist, and red, or slightly furred; the appetite capricious, often craving and voracious, with a long train of dyspeptic symptoms; the alvine discharges foul, dark, slimy, pitch-like, and showing no trace of healthy feces; the urine high-colored, and depositing a dark and often fetid sediment; the perspiration acrid and stinking; the breath offensive; emaciation. Enlarged tonsils, and aphthæ, are frequent concomitants.

DIAGNOSIS.—From mere *anæmia*, by the sallow and dusky countenance, as distinguished from the clear and pale skin, and by the depraved character of the secretions and excretions.

CAUSES.—Unwholesome diet; continued exposure to miasmata, or to a cold, damp atmosphere; impure air, want of

proper exercise ; the gradual operation of mineral poisons, as mercury, arsenic, copper ; or of animal poisons, as the syphilitic virus. The term cachexia is applied to those conditions of system in which certain local diseases occur in various parts, and are obviously due to some poison circulating in the blood, or to some important change in the composition of that fluid. Thus, we have cachexia syphilitica, tubercular cachexy, &c.

TREATMENT.—*Indications.*—I. To remove the exciting cause.
II. To improve the condition of the circulating fluid.

I. The exciting cause may be removed in the several cases specified by proper diet, change of air, proper exercise, change from unwholesome employments to healthy occupations, or, in the case of syphilitic cachexy, by inducing a new action in the system by preparations of mercury, or the iodide of potassium or iron.

II. The condition of the circulating fluid may be improved by proper diet, consisting of a due mixture of animal and vegetable food, with a proper proportion of acescent fruits and vegetables ; decoctions of herbs, combining a mucilaginous with a tonic principle, as the decoction of sarsaparilla ; due attention to all the secretions ; and the administration of preparations of mercury, in what are called alterative doses. Of these, the best is Plummer's pill, which may be given in doses of three, four, or five grains three times a day, with the decoction of sarsaparilla. The iodide of potassium or of iron may be substituted in many cases for the preparations of mercury. The proper action of the bowels should be secured by gentle aperients frequently repeated, and the skin should be kept constantly clean by daily ablution in the morning, or by the occasional use of the warm bath. The shower bath may also be used with advantage. Change of air and of scene, and a course of mineral waters, especially the chalybeates, may be resorted to with the greatest benefit.

CHLOROSIS—GREEN SICKNESS.

This disease is, as it were, intermediate between anæmia and cachexia, partaking of the characters of both. The blood is altered in quality, containing less of the red particles and of the solid ingredients, at the same time that the secretions are depraved.

SYMPTOMS.—Heaviness ; listlessness ; fatigue on the least exercise ; palpitations of the heart ; throbbing of the carotid arteries ; pains in the back, loins, and hips ; flatulency and acidity in the stomach and bowels, and the symptoms of dyspepsia.

The appetite is singularly depraved ; lime, chalk, and other

absorbents are sometimes greedily eaten, when the accustomed food is rejected. As the disease advances, the lips lose their color; the eyes are encircled with a livid areola; the face becomes pale, assumes a dusky yellowish hue; the feet are affected with œdematous swellings; and there is every indication of want of power and energy in the constitution. The breathing is hurried by the slightest exertion; the pulse is frequent, quick, but small; and the patient is affected with various symptoms of hysteria, cough, and sometimes confirmed hectic fever.

CAUSES.—Those of anæmia and cachexia combined. Amenorrhœa is a very general, though not a constant accompaniment.

TREATMENT.—That proper to anæmia and cachexia combined. The *indications* are: I. To restore the normal character of the blood. II. To correct the depraved secretions.

I. The first indication is fulfilled by the use of steel in full doses, a nourishing and wholesome diet, regular exercise, and pure air. No other tonic medicines are indicated. Change of air, and the use of any of the chalybeate waters, will be found beneficial. Sea bathing, and the use of the shower bath, may also be recommended.

II. The second indication is fulfilled by gentle aperients of aloes, myrrh, and bitters, combined with any of the mercurial preparations in small doses.

The combination already recommended (see Anæmia) of sulphate of iron, with extract of gentian, is perhaps the best and only one that need be used. If the form of mixture be preferred, sulphate of iron may be combined with small doses of sulphate of magnesia. Aloetic aperients may be combined with the steel. The compound aloetic pill of the Pharmacopœia, with steel and gentian in equal parts, may be administered four times a day when the bowels are sluggish; or small doses of calomel, or hyd. c. cretâ may be combined with the steel with much advantage.

The best mode of treatment is by aloetic purgatives, with or without minute doses of mercurial preparations, and steel in full doses. The menstrual discharge may, in most cases, be safely left to itself; but if any urgent symptoms connected with the functions of the uterus be present, they must be treated by the remedies pointed out under amenorrhœa, dysmenorrhœa, &c.

THE EFFECTS OF LOSS OF BLOOD.

The most familiar of these effects is *syncope*, of which the symptoms are vertigo, followed by loss of consciousness; suspension of respiration alternating with deep sighs; the pulse

and beat of the heart scarcely, if at all, perceptible; the surface pale, and bedewed with cold perspiration. Recovery takes place with momentary delirium, yawning, sickness, irregular sighing breathing, and a gradual return of color to the skin, and of pulse to the heart and wrist. In profuse hæmorrhage the state of syncope and of reaction alternate. In cases of fatal hæmorrhage, the symptoms become gradually and progressively worse; the countenance paler and more sunken; the extremities colder and colder; the breathing panting, gasping, or stertorous; the pulse imperceptible; restlessness and jactitation are followed by coma or convulsions; at length, the patient's strength is exhausted, he sinks, gasps, and expires.

Reaction, or recovery from a state of exhaustion, is generally gradual, but its symptoms are often peculiar and strongly marked. *Excessive reaction* is characterized by forcible beating of the carotids, with a sense of throbbing in the head; palpitation of the heart, throbbing in the scrobiculus cordis and in the course of the aorta, a frequent, bounding, and often irregular sharp pulse; a hurried, panting, sighing respiration; restlessness, jactitation, mental agitation, hurried manner, sudden muscular movements. Sometimes the patient has suddenly raised himself to the sitting posture, and as suddenly died. In this state the head suffers much, and is morbidly excited. Intolerance of light and sound, sleep disturbed by fearful dreams, waking hurried and perplexed, delirium, noises in the head, flashes of light before the eyes, and sense of tightness round the head, as if it were firmly bound by an iron hoop. The throbbing of the arteries is accompanied by the "bruit de soufflet." Mania, coma, amaurosis, and deafness are frequent concomitants of this state.

The sinking state is characterized by diminished energy of all the powers, especially of the nervous system. Snoring, stertor, blowing up of the cheeks, dozing, want of recollection, sometimes slight delirium; crepitus in the lungs, passing into rattling in the bronchi and trachea; hurried, sighing, catching respiration; short cough; pulse and beat of heart fluttering or imperceptible; tympanitis, loss of power over the sphincters. The pale and sunken countenance, restlessness, jactitation, delirium, and cold extremities, announce the approach of death, which generally takes place amid convulsions.

THE POST-MORTEM APPEARANCES produced by extreme exhaustion from loss of blood are, effusion of serum within the brain, œdema of the lungs, increased bronchial secretion, serous effusion into the pleura and peritoneum, general œdema or anasarca, tympanitic distention of the bowels.

THE TREATMENT is by stimuli combined with opiates, ene-

mata of warm barley-water or gruel, nourishing farinaceous food with wine. In the state of syncope, ammonia to the nostrils, friction to the extremities, cold water sprinkled in the face, or dashed on the surface, internal stimulants.—(See Marshall Hall's Principles of Medicine, p. 68, et seq.)

MIMOSIS INQUIETA—NERVOUS STATE.

SYMPTOMS.—Shiverings, flushings of the face, tremblings, palpitation, dyspnœa, pain in the left side, giddiness, faintings, loss of recollection, depression of spirits, anxiety and timidity, are the familiar symptoms of this state. In extreme cases, the patient is startled by the slightest noises, is in a state of constant apprehension of death, or of some great evil about to befall her, or she imagines that she has done something wrong, or is harassed by constant fears that she may be tempted to commit it. The sleep is often disturbed by frightful dreams; there is indigestion and flatulence, and the bowels are generally costive. In other respects the health does not suffer materially. The patient often wears the appearance of good health, and does not lose flesh. Hysterical paroxysms are sometimes superadded to the other symptoms, and the disease occasionally terminates in mania.

CAUSES—Predisposing.—The female sex. It is rare in men, though it does occasionally occur. **Exciting.**—In the female, excessive discharges, as hyperlactatio, leucorrhœa, menorrhagia, diarrhœa, and repeated loss of blood. Convalescence from severe diseases. Frights, long-continued anxiety or grief, great fatigue. Change of life, and the suppression of the menstrual discharge in persons of middle age. In men, excessive study, anxiety, dissipation, onanism.

DIAGNOSIS.—From hysteria, by the absence of hysteric fits, the globus hystericus, &c. Hysteria, in its usual form, may, however, occur with mimosis.

PROGNOSIS.—Favorable, but the recovery generally slow and tedious.

TREATMENT—Indications.—I. To remove the cause. II. To support the patient's strength. III. To allay the existing nervous irritation.

I. To fulfill the first indication, the treatment must vary with the cause.

II. The second indication requires the use of tonics, a generous diet, fresh air, and exercise.

III. The third indication is fulfilled by the use of sedatives, such as opium, hyoscyamus, and digitalis.

The following prescription, slightly varied according to circumstances, will be found to be suitable to the great majority of cases :

R. Acidi sulph. dil., ℥x. vel. xx.
 Tr. opii, ℥v., or tr. hyoscyami, ℥xx.
 Tr. digitalis, ℥v. vel. x.
 Infus. quassiae, ℥i. vel. ℥iiss.

The acid may be given in its full dose when the disorder is dependent on excessive discharges, and quinine may be substituted for the tonic infusion; aperients and alteratives may be administered as required.

CHAPTER V.

SCROFULA	King's Evil.
RACHITIS	Rickets.
PURPURA HÆMORRHAGICA	Land Scurvy.
PURPURA NAUTICA	Sea Scurvy.
RHEUMATISM	{ Articular.
	{ Muscular.
PODAGRA	Gout.

SCROFULA-STRUMA—KING'S EVIL.

THE various external and local symptoms produced by this disease are described by writers on surgery.

SYMPTOMS.—Its first appearance is usually between the third and seventh years of age, or at any period before the age of puberty, after which it seldom makes its first attack. It most commonly affects children of a lax habit, with smooth and soft skins; fair and fine hair; a peculiar fullness and rosy appearance of the face; full upper lip; tumid alæ nasi; large eyes, long silky eyelashes, and a very delicate complexion. A less common combination is the dark hair and olive complexion. It is also apt to attack such children as show a disposition to rickets, marked by a protuberant forehead, narrow and misshapen chest, enlarged joints, tumid abdomen, and irregular and unsound teeth. The subjects of this disease often display great acuteness and aptitude, with lively imaginations and ardent affections, and not unfrequently a great precocity of intellect. In addition to these marks of the scrofulous diathesis, may be mentioned a languid circulation, a slow and weak pulse, chapped hands and lips, chilblains, cutaneous diseases of the scalp and face, and chronic inflammation of the conjunctiva and eyelids.

The most common forms of scrofulous disease are strumous ophthalmia, porriginous diseases of the scalp, chronic inflammation and suppuration of the glands of the neck, enlarged tonsils, tabes mesenterica, white swellings, and pulmonary consumption. The scrofulous, too, are more subject than others to mental disorders.

CAUSES—*Predisposing.*—Hereditary taint; parents affected with syphilis; a variable climate. ***Exciting.***—All causes of debility acting on the predisposed—such as the impure air of crowded and ill-ventilated nurseries, schools, workshops, and factories, and the confined rooms inhabited by the poorer classes in towns; want of cleanliness; over-work; scanty and unwholesome food; bad water; damp and low situations.

TREATMENT—*Indications.*—I. To improve the general health. II. To promote the absorption or dispersion of local tumors, and the healing of ulcers, &c.

I. The general health may be improved by change of air, especially from a low and damp situation, to a high, dry, and bracing air; sea-air and sea-bathing; chalybeate mineral waters; tonics, especially the preparations of iron; and a nutritious diet, with a full allowance of animal food. The use of animal food, however, is not always indicated, and frequently does irreparable mischief. The exception to this rule is in the case of young children, and the subjects of *tabes mesenterica*. The state of the bowels must be carefully attended to, and gentle aperients must be administered at short intervals. A few grains of rhubarb, with small doses of hyd. c. cretâ, given every night, or every other night, followed by a tea or dessert spoonful of castor oil the following morning, is a good form of purgative. In severe cases, accompanied by extensive local disease, the iodide of iron, in doses of two or three grains three times a day, according to the age of the patient, may be given with much advantage.

II. Enlargements of the glands of the neck may be treated by the constant application of the emplastrum ammoniaci c. hydrargyro, or they may be painted frequently with the tinctura iodinii. If the patient is at the sea-side, poultices of seaweed (the *fucus vesiculosus*) may be kept constantly applied. When suppuration takes place, it must be encouraged by poultices, and the matter be let out by a small incision. Caustic should never be used, as it leaves behind it unsightly scars. Open ulcers generally put on an indolent character, and must be treated by local stimulants. In the treatment of other local affections occurring in scrofulous habits, this peculiarly indolent character must be borne in mind.

RACHITIS—RICKETS.

SYMPTOMS.—The essence of this disease is a deficiency of earthy matter in the bones. The process of ossification is extremely imperfect; dentition goes on slowly, and the teeth soon become loose and carious; the fontanelles and sutures are usually open, the head large, and the forehead prominent; the chest flattened at the sides, and the sternum projecting;

the epiphyses of the long bones become spongy, and the joints swell. This is commonly first perceived in the wrists and ankles. As the disease advances, the long bones yield to the weight of the body, and are twisted by the action of the muscles; the vertebræ are forced from their places, and the child becomes hump-backed. If he has begun to walk, his gait is unsteady and waddling. The mental faculties are, in general, unimpaired, and even more acute than in children of the same age. The other symptoms are those present in scrofulous affections. The disease rarely begins before the ninth month, or after the second year.

CAUSES.—Bad nursing, bad air, bad food, want of cleanliness.

PATHOLOGY.—Defective assimilation of food, leading to a deficiency of phosphate of lime in the structure of the bones.

PROGNOSIS.—Favorable. The disease is rarely fatal, though it creates great deformity.

TREATMENT.—Food of good quality and adapted to the child's age, fresh and pure air, cleanliness, exercise, cold or tepid bathing, and frictions. Tonics, especially steel, as steel-wine, in doses of a tea or dessert spoonful, three or four times a day, or the sulphate or potassio-tartrate of iron in full doses. Careful attention to the state of the bowels.

PURPURA—LAND SCURVY.

Synonyms.—Hæmorrhœa petechialis. Petechiæ sine febre.

Varieties.—1. *Purpura simplex*; 2. *Purpura hæmorrhagica*.

PURPURA SIMPLEX.—*Symptoms.*—After slight uneasiness, or trifling giddiness, an eruption of small round patches, of a dark-red color, chiefly on the thighs and legs, but sometimes extending over the whole body. After a few days, the first patches begin to fade, and new ones appear. There is little disturbance of the general health. The disease may last from three or four weeks to as many years.

CAUSE.—Obscure. Often attributed to cold.

TREATMENT.—Small bleedings from the arm, to promote the absorption of the effused blood, and tonics combined with a nourishing diet, and proper exercise, to give tone to the system.

PURPURA HÆMORRHAGICA.—*Symptoms.*—Debility, weariness, inaptitude for bodily or mental exertion, pains in the limbs, petechiæ of larger extent than in the foregoing variety; occasionally bullæ filled with liquid blood; gums swollen, livid, and spongy; hæmorrhages from the gums, nostrils, and mucous membranes generally; rigidity of the legs from effusion of blood into the texture of the muscles; extensive bruises; pulse feeble, but variable in frequency; in some cases, full and hard. In the more severe cases, all the symptoms of the sea-scurvy.

CAUSES.—A diet deficient in nutriment, or consisting chiefly of one kind of food. All causes of debility.

TREATMENT.—If the pulse is full and hard, bleeding is indicated, followed by tonics and a generous, nutritious, and *mixed* diet. When there is great debility, depletion is contra-indicated, and tonics and stimulants, with a generous diet, must be prescribed.

This disease, like most others, must be treated on general principles. Sometimes the effusions of blood are the result of general high action in a person whose capillaries are naturally weak; at others, of a general as well as of a local debility. The treatment must be modified accordingly.

PURPURA NAUTICA. SCORBUTUS—SEA SCURVY.

SYMPTOMS.—Heaviness, weariness, dejection of spirits, aversion to exercise, dull pains in the limbs, anxiety and oppression at the præcordia; the countenance pale, sallow, and bloated; the skin in some cases hot, in others cold and contracted; respiration hurried by the least exertion; the breath offensive; wandering pains in different parts of the body, particularly during the night; the pulse in some cases infrequent, in others small and frequent; the gums swollen, spongy, and livid, bleed upon the slightest touch; they separate from the teeth, which become loose; the tongue clean, moist, and pale; petechiæ and maculæ appear in various parts; the slightest scratch degenerates into a foul and ill-conditioned ulcer; the slightest pressure produces a bruise, and old cicatrices open afresh, and discharge a thin sanious fluid; spontaneous ulceration, likewise, takes place upon the gums and upon the surface of the body; the joints become swelled and stiff; the muscles of the legs, and the muscles of the calf especially, rigid, contracted, and exceedingly painful; the bowels are either obstinately constipated, or there is diarrhœa; the urine is transparent, high-colored, and acid; great emaciation ensues; passive hæmorrhages take place from the gums, nose, and ears, from the stomach and bowels, and occasionally from the lungs and bladder; all the excretions become intolerably fetid; still, however, the appetite frequently remains entire, the patient retains his intellectual faculties, talks with a loud voice, but is apt to faint on the slightest motion; and many patients have expired as they were being carried from their hammocks. Sudden death has often taken place in the earlier stage of the disease from some violent effort of the patient.

CAUSES.—A deficiency of vegetable food, or a diet restricted to a few articles of food. Impure air, a moist atmosphere, depressing passions of the mind, and the general causes of im-

paired health act as predisposing causes, or lead to the first appearance of the characteristic symptoms.

DIAGNOSIS—*From Malignant Fever*.—By the absence of feverish symptoms; by the intellectual faculties being little impaired; by the disease coming on more gradually, and continuing a much longer time; by its not being contagious.

PROGNOSIS.—Will be drawn from the severity of the disease, and the situation of the patient with respect to vegetable diet, or other proper substitute.

Favorable Circumstances.—The constitution not having been weakened by previous disease; little reduction of strength; moist skin; bilious diarrhoea; the patient being still capable of moving about; infrequent pulse; the petechiæ, if any appear, being of a bright red color; the absence of ulceration.

Unfavorable.—Great prostration of strength; redness of the eyes, flushed countenance; frequent weak pulse; profuse hæmorrhages; petechiæ and maculæ of a dark livid color; extreme oppression at the præcordia; fetid and involuntary evacuations.

TREATMENT—*Indications* —I. To supply what is wanting in the diet. II. To palliate urgent symptoms.

The first indication is fulfilled by the use of

Vegetable food of every description, especially of the acescent fruits, as the orange, the lime, the lemon; or the citric acid in a concrete form; if there be great prostration of strength, they may be united with wine; fermented and fermenting liquors, as ale, cider, spruce beer, infusion of malt, fermenting wines, &c.; the subacid fruits; sugar, molasses; potatoes.

Occasional aperients of infusion of tamarinds, cream of tartar, or the sulphates of soda and magnesia, may be given, and the utmost attention must be paid to cleanliness.

With regard to the second indication,

Ulcerations of the gums require astringent gargles of alum, muriatic acid, linimentum æruginis, decoction of bark, the steam of vinegar. Acute pains are relieved by opium. Oppression at the chest, and difficulty of breathing, by stimulants; as nitric and sulphuric æther with camphor. Contractions of the muscles of the legs, by fomentations of vinegar and water, or emollient cataplasms, and by friction; scorbutic ulcers upon the surface of the body, by slightly stimulant applications. A due admixture of animal and vegetable food is, at the same time, the best preservative and curative measure.

PROPHYLAXIS.—A due admixture of vegetables with the food, or, where fresh vegetables can not be procured, lemon juice or citric acid. Among fresh vegetables, the potato is one of the best. As moisture is undoubtedly injurious, dry

rubbing should be substituted for frequent washing in our ships.

ARTHRITIS—ARTICULAR RHEUMATISM.

SPECIES.—1. Acute ; 2. Chronic.

ACUTE ARTICULAR RHEUMATISM—RHEUMATIC FEVER.

SYMPTOMS.—Lassitude and rigors succeeded by fever, a hard, full, and quick pulse, and all the usual symptoms of synocha ; sense of weight, and coldness of the extremities ; great restlessness ; obstinate costiveness. After a short time (in the course of one, two, or three days), inflammation with redness of the surface, acute pain, extreme tenderness, tumor, and tension, make their appearance in one or more of the larger joints of the body. The pulse from 90 to 120, full and hard ; the blood, when drawn from a vein, exhibits the inflammatory surface or buffy coat ; there is loss of appetite and great thirst ; the tongue is coated with a white fur ; the body is usually obstinately costive ; the urine high-colored ; sometimes the skin is bathed in a profuse acid sweat, which, however, affords no relief.

The febrile symptoms and the pain generally suffer an exacerbation at night. The disease is rarely confined to the joints first attacked ; but, after continuing in them some hours or days, it attacks fresh joints, sometimes continuing unabated in those first affected, at others leaving them quite free from pain or swelling. In rarer instances it returns to the joints which were first affected, and ultimately extends to all the large joints of the body. Some amendment usually takes place at the end of about a fortnight ; the pain lessens, especially at night ; there is less fever, and less perspiration ; the urine is more abundant and less charged with deposits ; the appetite returns ; the thirst diminishes ; the pulse falls ; and the patient's movements become more free. Convalescence, however, is rarely uninterrupted, and the affection of the joints often assumes a chronic form.

Such are the symptoms when the disease is confined to the joints ; but in a large proportion of cases it extends to the fibrous tissues of the heart. The symptoms which denote this formidable complication are, sudden pain in the præcordia, palpitation, dyspnoea, and a sense of oppression. The pain is increased by pressure in the intercostal spaces, by inspiration, and by lying on the left side. The pulse generally increases in frequency, and is marked by a peculiar thrill.

For the stethoscopic indications of this affection of the heart, see Diseases of the Heart, Carditis, Pericarditis, &c. As this affection is often obscure, it should be carefully sought for.

Its earliest indications are dyspnœa, with a peculiarly listless expression of countenance.

CHRONIC ARTICULAR RHEUMATISM.

SYMPTOMS.—The chronic form of rheumatism may be either a consequence and termination of the acute, or it may be independent of it. In the first case, the parts which were affected with inflammation are left weak, rigid, in some instances œdematous; and the pain, before shifting, is now usually confined to particular parts; sometimes, however, it still shifts from joint to joint, but without occasioning any inflammation or fever. Exposure to wet and cold will often bring on an attack, which continues for a considerable time, and at length goes off, leaving the affected joints weak and stiff.

ANATOMICAL CHARACTER.—Inflammation of the *fibrous* tissues of the parts affected, leading to deposits of lymph, and the consequent stiffening of the joints.

CAUSES.—*Predisposing.*—Hereditary predisposition. The male sex; previous attacks; age from 15 to 60.

Exciting.—Exposure to wet and cold.

DIAGNOSIS.—The pathognomonic symptoms of the acute form are, synocha, with pains and inflammation of the larger joints, under which the integuments become distended, smooth, and of a peculiar pale red color.

From Podagra.—By its generally attacking the larger joints only; by the pain and inflammation shifting their seat; by the disease not having been preceded by symptoms of dyspepsia; by its occurring at any period of life, whereas gout is usually confined to the adult period. It may be confounded with neuralgic affections, but the history of the case will enable us to form an accurate diagnosis.

PROGNOSIS.—*Favorable Symptoms.*—A general, but not unnaturally profuse perspiration; the deposit of a lateritious or furfuraceous sediment in the urine; eruptions on the skin; moderate hæmorrhage of florid blood from the nose or other parts.

Unfavorable.—The inflammation becoming erysipelatous, and assuming a dark red or rose color; and this followed by vesications, delirium, pale urine, metastasis of the inflammation to the heart, chest, or brain, producing the symptoms of the idiopathic diseases of those organs.

TREATMENT.—*Of acute Rheumatism.*—The indications are the same as those of the other phlegmasiæ, and are to be fulfilled,

I. By general and topical *blood-letting*.

General bleeding should be had recourse to at the onset of

the disease in all cases where the vascular action is strong, the heat considerable, the constitution robust, and the patient not advanced in years ; and it may be repeated according to the violence of the symptoms.

The repetition of blood-letting is to be regulated by the effect produced, and not by the buffy appearance of the blood, which in many cases continues to increase, notwithstanding the abstraction of blood. General bleeding may be followed up by topical blood-letting, by leeches, and cupping, when there is considerable pain and tumefaction about a joint or limb.

Thus far most practitioners are agreed, but much difference of opinion exists with regard to the other remedies. Calomel and opium, tartar-emetic and opium, colchicum, either alone or in combination with opiates, and bark or quinine, all have their advocates.

The treatment which appears to me to have been most effectual is a full bleeding, followed immediately by quinine in two-grain doses every three hours. This may be combined with tartar-emetic where there is much inflammation and fever, and opiates may be given at night when the patient is extremely restless. When the disease is complicated with heart affection, cupping to the region of the heart, followed by blisters, is indicated, and a combination of tartar-emetic, digitalis, and opium may be given at intervals of two or three hours.—(G.)

Treatment of the chronic Form.—When the inflammation is confined to one or two of the joints, local applications are of service. If there is inflammation, leeches should be applied. Blisters around the affected joint are often of use. Friction is also useful. Where the disease is more extensive, we must employ general remedies to the exclusion of local ones. The steam bath is among the most powerful of these remedies. The warm bath is of less efficacy, but the thermal mineral waters of Vichy, Aix-la-Chapelle, Karlsbad, Wiesbaden, &c., have long enjoyed a high and deserved reputation in the treatment of chronic articular rheumatism. A warm climate also proves beneficial to cases which have arisen in a cold one, though warm climates are peculiarly favorable to the occurrence of rheumatic affections. The medicines in use for the treatment of this disease are Dover's powder, colchicum in combination with opium, guaiacum, sarsaparilla, and the hydriodate of potash. The latter remedy is of great service in articular affections produced by a syphilitic taint : its efficacy in other forms of the disease is more doubtful. The nitrate of potash in large doses, which has been lately recommended in the acute form of the disease, may perhaps prove serviceable in the chronic.

MUSCULAR RHEUMATISM.

SYMPTOMS.—Pain, varying in severity and kind, from a dull aching to the most acute lancinating pains, affecting the entire body, the trunk, a single limb, or a single muscle or group of muscles; coming on sometimes suddenly, at others after shivering and slight feverishness; often forming the most distressing feature of a common cold, and remaining after the other symptoms have vanished. The pain is increased by motion of the affected part, by percussion with the points of the fingers, and by the sudden removal of pressure; but relieved by firm pressure gradually applied. It is augmented in some cases by the warmth of bed, in others relieved by it. When increased by warmth, it is called *acute*; when relieved by it, *chronic*. Its duration is variable, extending from a few hours or days to as many months or years, and often defying all treatment. The general health is little, if at all, affected.

Varieties.—Some forms of the disease have obtained distinct names according to the seat of the affection; as *pleurodyne* when it attacks the muscles of the side, *lumbago* when its seat is the loins, *crick* in the neck when it affects the muscles of the neck.

[In the muscular form of rheumatism the use of cathartics can not be too strongly urged; for it will often be found to depend, especially in young females, upon a constipated condition. Wherever there is a foul, loaded, pasty tongue, with an offensive breath, and great susceptibility of the nervous system, so common in indigestion, cathartics, perseveringly used, are indicated. Violent purging should never be employed, but the bowels ought to be freely evacuated every second day until the discharges evince the recent secretion of bile. The best cathartic is a combination of aloes and blue pill; caution, however, should be used that the mercury do not affect ptialism, for mercury carried to this extent will, by its irritative action, greatly aggravate the nervous symptoms so distressing in this form of disease.]

PLEURODYNE.

This is a very common affection. It is a complication of almost all the functional diseases of young and middle-aged females, occurring in dyspepsia, amenorrhœa, menorrhagia, leucorrhœa, hyperlactatio, chlorosis, &c., and in almost all diseases accompanied by much debility. It almost universally attacks the muscles of the left side. In males it is equally common on both sides. Acute pain in the muscles of the left side generally precedes by some days the appearance of shingles. Its *causes* are debility, over-exertion, as in the effect of

coughing, and distention of the stomach with flatus. The *diagnosis* is of great importance, though the disease itself is of little or none. It is distinguished from pleuritis, with which it is often confounded, to the great injury of the patient, by the absence of the constitutional symptoms of the acute phlegmasiæ, and of the stethoscopic indications of pleurisy; by being increased by motion of the affected parts, as in raising the arm, or twisting suddenly round, or by a sudden inspiration or expiration, by the effect of sudden and slight percussion with the points of the fingers, and by the sudden increase of the pain on the removal of pressure. Any one of these signs, in the absence of severe constitutional symptoms, is decisive of the character of the affection. It is distinguished from the pain preceding the eruption of shingles by its less severity. Extremely acute pain should lead the practitioner to foretell shingles as at least a possible event. Pleurodyne may be complicated with chest disease, for it is a common consequence of a cough, and with acute dyspepsia: so that the practitioner should not rest satisfied with ascertaining the real nature of the pain, but should inquire for possible complications. The treatment of idiopathic pleurodyne is by the application of the emplastrum belladonnæ; in mild cases, of the common emplastrum roborans; in more severe ones, of a blister, with the internal administration of colchicum. Symptomatic pleurodyne must be treated by removing its cause.

Allied to pleurodyne is an acute pain of the muscles of the abdomen or diaphragm, or of both together. That of the abdomen is apt to be confounded with peritonitis, as pleurodyne with pleurisy. The diagnosis is easy. Graduated pressure gives relief, except where sudden expiration throws the muscles into action; but the sudden removal of pressure causes acute pain; percussion with the points of the fingers and sudden motion of the part affected also increase the pain. The absence of severe constitutional symptoms will assist the diagnosis, as will also the kind of respiration. In pleurodyne, the respiration is abdominal; in rheumatism of the muscles of the abdomen, it is carried on by the chest. When the diaphragm is much affected, the respirations are short and catching, and accompanied with acute suffering.

Muscular rheumatism also attacks internal viscera, as the muscular texture of the heart, causing violent palpitation, the muscular coat of the œsophagus, giving rise to much pain in swallowing, and the muscular substance of the impregnated uterus leading to severe pains, similar to labor pains. Many internal muscular pains are connected with flatulence, or symptomatic of dyspepsia.

LUMBAGO

occupies the mass of muscles in the loins, and when severe, confines the patient to bed, or obliges him to walk carefully with crutches or with the assistance of others. The slightest motion causes excruciating agony. *Diagnosis.*—From the pains in the back which accompany the cold stage of febrile disorder, by the effect of motion, which increases the former, but has no effect on the latter; from disease of the kidneys, by the unchanged character of the urine, or if it undergoes a change, by its consisting in the common lithic acid deposits, and by the absence of symptoms of disease of the kidney. Transient and severe attacks of rheumatism in a single muscle or group of muscles sometimes pass off, after lasting a few hours or a day, by a copious red sediment in the urine.

TREATMENT.—The *acute* form of rheumatism, which is increased by the warmth of bed, requires colchicum and opium, the warm bath, local depletion, by cupping or leeches, where the affection is local, and the application of the belladonna plaster, or friction with an opiate liniment. Veratria ointment has been recommended, but must be used with caution. The *chronic* form is best treated by guaiacum in combination with stimulants, in the form of the tinctura guaiaci ammoniata and by local stimulants, as frictions with stimulating embrocations, blisters, and acupuncture. The latter remedy has often effected a cure of severe and lingering attacks. It may be very advantageously employed in lumbago. Electricity has also been used with advantage. Persons subject to rheumatism should wear flannel or cotton next the skin, and should carefully protect the parts most liable to the disease. They should also avoid as much as possible exposure to wet and cold.

PODAGRA—THE GOUT.

SPECIES.—1. *Podagra regularis*; with a violent inflammation of the joints, enduring for several days, and receding gradually, with swelling, itching, and desquamation of the part affected.

2. *Podagra atonica*; debility of stomach, or other internal part, either without the expected or usual inflammation of the joints, or with slight and fugacious pain in them, often alternating with dyspepsia, or other symptoms of debility.

3. *Podagra retrograda*; with inflammation of the joints suddenly disappearing, followed immediately by affections of the stomach or of some internal part.

4. *Podagra aberrans*; with inflammation of some internal part, preceded or not preceded by inflammation of the joints, which quickly disappears.

SYMPTOMS—*Of the regular Gout.*—Dyspepsia, with its usual attendants, lassitude, torpor, and dejection of spirits; unusual coldness and numbness of the extremities, alternating with sense of pricking or formication; frequent cramps; unusual turgescence of the veins of the leg. The paroxysm most frequently comes on about two o'clock in the morning, with excruciating pain in the articulations of the great toe, succeeded by rigor, horror, and pyrexia. The pain continues to increase in violence, and, having attained its acmé toward the following evening, gradually ceases; a general moisture breaks out upon the skin, and the patient, freed from his torment, falls into a sound sleep; upon awakening from which, he finds the parts, before painful, now swollen and inflamed. In several succeeding evenings there is a return of pain and fever, which continue with more or less violence during the night, and go off at break of day.

Of the atonic Gout.—When the gouty diathesis prevails in the system, but, from certain causes, does not produce the usual inflammatory affection of the joints, it often appears in the form of an atonic affection of some internal part. If it be in the *stomach*, there are pain, nausea, vomiting, eructations, dejection of mind, and other symptoms of dyspepsia and hypochondriasis: these are frequently accompanied with cramps in several parts of the trunk and upper extremities; sometimes there is obstinate costiveness, sometimes diarrhœa. If in the *viscera of the thorax*, it produces palpitation, syncope, asthma. When the *head* is affected, there is cephalalgia, vertigo; and apoplectic and paralytic affections are sometimes the consequence.

The retrocedent gout is where an inflammation of the joints, having come on in the usual manner, but without reaching the ordinary degree of severity, or continuing for the customary time, suddenly and entirely ceases, while the disease is transferred to some internal part. *To the stomach*; when great anxiety, sickness, violent pain and vomiting, with peculiar sense of coldness in the epigastric region, are induced. *To the heart*; occasioning syncope. *To the lungs*; asthma. *To the head*; apoplexy, or palsy.

The misplaced gout is when the gouty diathesis, instead of producing the inflammatory affection of the joints, produces an inflammation of some internal part, which appears with the same symptoms that attend inflammation of those parts arising from other causes.

CAUSES—*Predisposing and remote.*—The adult age, more especially the middle period of life (it seldom occurs before the age of twenty, or after sixty); hereditary predisposition; full plethoric habit of body; indulgence in the use of animal

food and fermented liquors ; sedentary and studious life ; the free use of acids and acescent wines ; dyspepsia. Gout is not peculiar to the rich, but often affects the poor who have led a life of hardship, and have never possessed the means of self-indulgence.

Exciting.—The application of cold to the extremities ; fatigue ; anxiety of mind ; excessive evacuations ; sprains ; intemperance of whatever kind ; the ceasing of usual labor ; the sudden change from a very full to a very spare diet ; the suppression of customary evacuations, as of the piles, which is a common accompaniment of the gouty diathesis.

DIAGNOSIS—From Rheumatism.—By the previous dyspeptic symptoms ; by the pains in the one disease attacking the smaller, in the other the larger joints ; by the peculiar mode of its attack (see Symptoms) ; by its not being preceded, or accompanied at its commencement, with symptoms of synocha ; by the age of the patient.

PROGNOSIS—Favorable.—Youth, and an unimpaired constitution ; the more severe the paroxysm, the shorter its duration ; the longer the intermission, the more effectual is it in removing various anomalous diseases to which the patient had been before subject ; its not being hereditary.

Unfavorable.—Impaired constitution ; concomitant visceral affections ; hereditary predisposition to the disease ; the deposition of chalky matter on the joints ; the disease suddenly receding from the extremities, and attacking an important internal organ, as the stomach, heart, brain, lungs, &c.

TREATMENT.—The *indications* in the regular gout are,

I. To alleviate pain, and shorten the duration of the paroxysms. II. To prevent their return.

The first indication is best fulfilled by diaphoretics and opiates.

In a regular fit of the gout, the assistance of medicines is not so great as is generally supposed ; all that is required is to keep the inflamed part moderately warm with flannel, wool, or fleecy hosiery ; to confine the patient, if young, to a spare regimen ; if advanced in life, or a high liver, to enforce a more moderate one ; carefully abstaining from every thing that might add to the irritation, keeping the limb as quiet and still as possible, and taking care that his mind be not ruffled, but, on the contrary, soothed and calmed.

Some practitioners have been induced to adopt an antiphlogistic mode of treatment, which, in a few instances, has soon removed a regular fit of the gout ; in others, it has induced an alarming and serious train of symptoms, by inducing metastasis to the brain, heart, &c.

Many topical remedies have been recommended ; pedilu-

vium of simple water ; a tepid bath of water and muriatic acid, in the proportion of one ounce to a gallon of water : leeches ; very cold water ; ice ; blisters ; stinging with nettles ; burning with moxa ; covering the part with oilskin, and the like ; but, perhaps, the less the part is interfered with the better, for the use of extreme remedies often leads to the translation of the inflammation to an internal organ. Exciting a perspiration on the part by fleecy hosiery or flannel is sometimes attended with the most beneficial effects. A narcotic cataplasm or anodyne fomentation also affords great relief.

Dr. Kinglake has revived the practice of applying cold water and refrigerants to the inflamed part, which in many cases has had the desired effect ; but instances are not wanting in which it was supposed to have been productive of a fatal retrocession. Scudamore and Mackintosh strongly advise camphorated spirit very much diluted with water ; others use a tepid evaporating lotion.

The Eau Medicinale d'Husson and Wilson's Tincture for the Gout are dangerous medicines, the chief ingredient being colchicum or veratrine. -

The best and safest mode of administering these medicines is in small doses, in which way they have no sensible operation, except that of gradually reducing the force of the symptoms. With this view, the bowels are to be first cleared with proper aperients, or the colchicum may be given in conjunction with gentle saline aperients. A combination of a drachm of sulphate of magnesia, ten grains of the carbonate, from twenty to thirty minims of vinum colchici, and a few drops of laudanum, is a very useful remedy.

The second indication is effected by regularity of life ; avoiding the exciting causes of the disease ; abstinence from the use of animal food and fermented liquors ; milk and vegetable diet ; exercise ; friction with the flesh-brush ; tonic and stomachic bitters and chalybeates, such as are recommended for the cure of dyspepsia ; Bath waters ; the regular use of mild cathartics ; the long-continued use of alkaline medicines.

The atonic gout is to be treated by carefully avoiding all the causes inducing debility ; gentle exercise ; cold bathing ; the moderate use of animal food, and the least acescent wines, as Sherry and Madeira ; tonics, stomachics, and chalybeates, such as are recommended in indigestion ; guarding against the effects of cold by wearing flannel next the skin ; in severe attacks, blisters to the extremities are serviceable.

Of the retrocedent Gout.—If the stomach be the seat of the disease, the liberal administration of warm brandy and water, or wine and aromatics ; æther, ammonia, asafoetida, camphor, musk, and sinapisms to the feet.

GOUTY CONCRETIONS.—Gouty concretions, or chalk-stones, as they are called, are deposited in the cavities of joints, in the bursæ mucosæ, in the ligaments, aponeurosis, and cellular membrane, and even under the cuticle. They consist of urate of soda, which is extremely insoluble, and consequently, when once deposited, does not admit of removal except by some means which will convert the insoluble into a soluble salt. For this purpose, Dr. Alexander Ure (see Med. Chir. Trans., vol. xxiv.) recommends the exhibition of benzoic acid in doses of a scruple, about an hour after each meal. This substance is advantageously combined with some salt of soda, and the best for the purpose is the bicarbonate, which may be given in doses of one, two, or three drachms. This remedy must be persevered in for a considerable period where extensive deposits have already taken place.

CHAPTER VI.

INFLAMMATION.

HÆMORRHAGE.

DROPSY.

INFLAMMATION.

SYMPTOMS: when external.—Redness, swelling, heat, and pain. The *redness* arises from the increased quantity of red blood contained in all the vessels of the part; the *swelling* from the same cause, combined with the secretion of serum, albumen, or lymph; the *heat* exceeds that of other superficial parts, but never rises higher than that of the blood; the *pain* is explained by the larger supply of blood to the nerves of the part, and the pressure of the surrounding textures upon them. It is accordingly most severe where the surrounding textures are unyielding, as in whitlœ; comparatively slight in the lax mucous membranes.

The local symptoms of *internal* inflammation are pain and disturbance of function. The *pain* in parts which can be submitted to pressure is increased by that pressure, and this forms an important means of diagnosis. The *disturbance of function* consists in secreting organs, of increase, diminution, or total suppression of their appropriate secretion, according to the degree of the inflammation; in other organs, of various degrees of excitement: in the brain, delirium; in the eye and ear, impairment of light and sound; in the lungs, dyspnœa.

General or constitutional Symptoms.—In healthy persons, those of synocha, viz., increased heat of surface; thirst; frequent, full, hard pulse; scanty secretions, &c. In severe and extensive inflammation, or in unhealthy persons, those of con-

stitutional irritation; in the drunkard, those of delirium tremens; in extremely debilitated subjects, those of synochus or typhus.

TERMINATIONS.—1. Resolution. 2. Increased secretion. 3. Hæmorrhage. 4. Adhesion. 5. Softening. 6. Induration. 7. Suppuration. 8. Gangrene.

CAUSES—*Predisposing*.—Sanguine temperament; full habit of body; general debility. *Exciting*.—1. Mechanical and chemical irritants. 2. Cold. 3. Certain alterations in the condition of the circulating fluid. 4. Morbid poisons.

CAUSES WHICH MODIFY THE CHARACTER OF INFLAMMATION:

1. Texture. 2. Condition of system.

1. *Texture*.—The *serous* membranes in acute inflammation take on the adhesive inflammation, very rarely the suppurative; in less degrees of inflammation, they pour out serum or liquid albumen. The *mucous* membranes secrete mucus, pus, and, in rare cases, coagulable lymph, and are prone to suppuration, and not to adhesion of opposed surfaces, as also to softening. The *cellular* tissue, when inflamed, secretes serum, and, in higher degrees of inflammation, coagulable lymph and pus. Its common termination is by *abscess*. Inflammation of the cellular tissue is called *phlegmonous* inflammation. The *parenchymatous* substance of organs is apt to be softened by acute, and hardened by chronic inflammation; it is also liable to abscess and gangrene. Of the *fibrous* tissues, tendon is prone to gangrene, cartilage and ligament to ulceration. *Ossous* inflammation terminates in gangrene (caries and necrosis). The *skin* resembles the mucous membranes in being prone to suppuration. Vesication arises from the effusion of serum from the surface of the true skin under the cuticle. Gangrene is also a common termination of cutaneous inflammation.

The general symptoms also vary materially with the tissue affected. Thus, in inflammation of the *serous membranes*, there is little of surface, little muscular debility, little tendency to delirium, with slight acceleration of pulse; but there is acute pain, great tolerance of loss of blood, an excess of fibrin, and a cupped and buffed appearance in the blood itself. In that of the *mucous membranes*, on the other hand, there is little pain, little tolerance of loss of blood, no increase of fibrin, and the absence of the cupped and buffed appearance. There is, however, an exception to this rule in the case of croup, where the mucous membrane of the trachea takes on the characteristic features of inflammation of the serous membranes.

2. *Condition of System*.—The effect of condition of system is well illustrated by the exanthemata. In *measles*, the inflammation which prevails is similar to that produced by a common cold, and, in severe cases, leads to the effusion of coagulable

lymph from the larynx and trachea ; in *scarlatina*, there is a disposition to ulceration in the mucous membrane of the pharynx and adjoining parts ; in *small-pox*, the inflammation leads to gangrene and suppuration around the dead points. Another illustration of the modifications produced by states of system is afforded by common inflammation of the skin and erysipelatous inflammation.

It is of the utmost importance that the practitioner should be familiar with the constitutional symptoms which mark the several terminations of inflammation. *Acute adhesive inflammation* is accompanied by a full, strong, hard pulse, or a small wiry pulse, somewhat increased in frequency, little or no heat of skin, no headache, vertigo, or delirium, no muscular tremor or debility, no change in the character of the urine, and there is great tolerance of blood-letting. *Suppuration* is announced by darting and excruciating pains, by severe, and often by repeated rigor, occurring, in some cases, almost with the regularity of ague, and followed by heat and sweating—the symptoms, in fact, of hectic fever. *Gangrene* is indicated by sudden cessation of pain, by collapse of the entire system, pallor, cold, clammy sweat, sunken features, sometimes low delirium, sometimes peculiar self-possession, a dry brown tongue, sordes on the teeth, a small, frequent, feeble pulse—in fact, the symptoms of the typhoid state.

TREATMENT OF INFLAMMATION.—The remedies employed in the treatment of *acute* inflammation are either general or local. The *general remedies* are blood-letting by venesection or arteriotomy, the tartrate of antimony, and mercury. The *local remedies* are local depletion by leeches, cupping, or scarification ; division of the part ; cold ; cataplasms and fomentations and counter-irritants. In *chronic* inflammation, local remedies alone are employed, the general remedies being used to improve the health, and not for the purpose of removing the inflammatory action. The local remedies most in use are stimulants, which have the effect of causing the capillaries to contract. Of these, the most efficacious are nitrate of silver, applied over and around the inflamed part ; tincture of iodine ; iodine ointment, &c. In internal inflammations, general and local blood-letting, tartrate of antimony, mercury, and counter-irritants are the remedies most in use. (For the theory of inflammation, see Introduction, p. 40, et seq. ; and for the treatment, p. 149, et seq.)

HÆMORRHAGE.

Hæmorrhage is either *general* or *local*. *Purpura nautica* and *purpura hæmorrhagica* are examples of general hæmorrhage. *Epistaxis*, *hæmatemesis*, *melæna*, &c., are examples of local

hæmorrhage. The *causes* of hæmorrhage are, 1. A strong action of the heart; 2. Venous congestion from obstruction to the return of blood; 3. Debility of the capillary vessels. The hæmorrhages which take place from the mucous membrane are probably examples of hæmorrhage from congestion occurring in a naturally loose and yielding texture.

Hæmorrhage, arising in healthy states of system from strong action of the heart, is called *active* hæmorrhage; that which arises from a weakened state of capillaries is called *passive* hæmorrhage; that which arises from congestion might be termed, with equal propriety, *congestive* hæmorrhage.

TREATMENT.—In *active* hæmorrhage those remedies must be used which are recommended in *acute* inflammation. *Passive* hæmorrhage must be combated by such remedies as give strength to the system; these belong to the class of tonics and stimulants; and by remedies which have a peculiar action on the capillary vessels, as lead and the astringents. *Congestive* hæmorrhage must be treated by removing the existing congestion, whether it arise from pressure or from relaxation of the capillary vessels.

DROPSY.

Causes of dropsical effusions.—1. Inflammation. 2. Debility. 3. Obstruction to the return of blood. 4. Peculiar organic diseases, leading to an alteration in the constituent principles of the blood; for instance, disease of the kidney, as pointed out by Dr. Bright.

The TREATMENT of inflammatory dropsy is that of inflammation; dropsy from debility requires the same tonic treatment as passive hæmorrhage; that arising from obstruction requires the removal of the obstructing cause; and that form which is dependent on diseased viscera can be effectually treated only by remedies which restore the part affected to its healthy state. The increase of the secretions is an indication applicable to all forms of dropsy alike, but the choice of remedies for that purpose must be determined by the state of the system.

The various local dropsies will be treated in the following pages under the head of ascites, anasarca, hydrothorax, hydrocephalus, &c.

The strong analogy which exists between the state of the vessels in acute inflammation, in active hæmorrhage, and in inflammatory dropsy, makes the indications for the treatment of the one to be nearly identical with all the rest, and the same observation applies to chronic inflammation, passive hæmorrhage, and dropsy from debility. The state of the vessels in congestion, too, is the same, whether they pour out blood, or serum, or neither. The same treatment, also, is required in either case.

SPECIAL DISEASES.

CHAPTER I.

DISEASES OF THE NERVOUS SYSTEM.

1. Of the Brain.
2. Mental Disorders.
3. Of the Spinal Marrow.
4. Of the Nerves of Sensation.
5. Of the Nerves of Motion.
6. General Disorders of the Nervous System.

DISEASES OF THE BRAIN.

PHRENITIS	Inflammation of the Brain.
MENINGITIS	Inflammation of the Membranes of the Brain.
HYDROCEPHALUS	Water in the Head.
APOPLEXIA	Apoplexy.
CHRONIC DISEASES OF THE BRAIN.	
CEPHALALGIA	Headache.

PHRENITIS—ENCEPHALITIS—INFLAMMATION OF THE BRAIN AND ITS MEMBRANES.

SYMPTOMS.—Inflammation of the brain and its membranes sets in in different ways in different cases. In one class of cases it begins with acute pain in the head, and violent delirium ; in a second, with nausea, bilious vomiting, and obstinate constipation ; in a third, with a paroxysm of general convulsions ; in a fourth and very rare class of cases, with loss of speech. The disease, when fully formed, is characterized by excruciating pain in the head ; throbbing of the temporal and carotid arteries ; flushed face ; injected and brilliant eyes ; contracted pupil ; and a peculiarly wild expression of countenance. There is intolerance of light and sound, constant watchfulness, want of sleep, fierce delirium, and convulsions. The skin is hot and dry, the pulse hard and frequent ; the tongue red and dry, or covered with a white fur ; there is intense thirst, with nausea and bilious vomiting ; and the bowels are obstinately confined. These symptoms, which belong to the stage of *excitement*, continue for a variable period of from one to two or three days, and, gradually subsiding, are

succeeded by *collapse*, characterized by stupor, low muttering delirium, indistinctness of vision, insensibility of pupil, strabismus, twitchings of the muscles, tremors, or partial paralysis; relaxation of the sphincters, occasional retention of urine, cold sweats, the facies Hippocratica, ending in profound coma, and death.

TERMINATIONS.—When fatal, in stupor and insensibility; or, if protracted, in great prostration of strength, with typhoid symptoms. Recovery may be complete, or the disease may leave behind it mania, dementia, or paralysis. The duration varies from twelve hours or a day to two or three weeks, or even more.

CAUSES.—Exposure to excessive heats, or to vicissitudes of temperature; subjecting the head uncovered to the rays of a vertical sun; violent exercise; excited passions of the mind; intense study; the presence of irritating matter in the stomach; external violence; the abuse of spirituous liquors; metastasis of gout, rheumatism, erysipelas, otitis, exanthematous fevers, small-pox, measles, scarlatina; whooping-cough, dentition; the repression of cutaneous affections, as those of the scalp; pneumonia, phthisis, renal affections, and all the febrile diseases.

DIAGNOSIS.—*From Mania*, by the one being accompanied with violent fever, the other not; by the speedy termination of the one, and the longer duration of the other. *From the Delirium of Synocha*.—In phrenitis, the delirium is the primary affection; in synocha it is consequent upon the general fever. *From the Delirium of Typhus*, by the mode of accession; the affection of the head in phrenitis comes on suddenly, or after a short continuance of premonitory symptoms, and it is extremely violent; the delirium of typhus is preceded by the characteristic marks of that disease, and is more moderate in degree. *From the effects of Loss of Blood*, by the history of the case, the absence of symptoms of inflammation, and the pallor of the skin and countenance. *From Delirium Tremens*, by the tremulous motions of the body and limbs, and, in most instances, by the pallor of the surface. In delirium tremens, too, the patient is easily roused, and can answer questions.

ANATOMICAL CHARACTERS.—Thickening of the arachnoid, effusion of serum mixed with flakes of lymph, or of coagulable lymph, or of pus under the arachnoid and into the meshes of the pia mater; similar effusions into the ventricles, with softening of their parietes; incised surfaces of the brain presenting numerous red points, the medullary substance of a light pink hue, and the cineritious substance of an ashy red, not removed by washing; softening of the substance of the brain; abscess of the brain.

PROGNOSIS — *Favorable*. — The appearance of a warm and equable perspiration ; diarrhœa ; a sediment in the urine ; hæmorrhage from the nose ; the pulse diminishing in frequency, and becoming more full and soft ; the return of sleep and consciousness ; inflammation attacking a less important part. If preparations of mercury have been given, the occurrence of salivation.

Unfavorable. — Profound insensibility, tremors, convulsions, involuntary evacuations ; suppression of urine ; the face from being flushed suddenly becoming pale ; paralysis ; inflammation of other viscera, without diminishing the symptoms of the original disease ; delirium changing to coma.

TREATMENT. — I. *During the period of Excitement*. *Indication*. — To diminish the quantity of circulating fluid, and the force of the circulation, in the system in general, and in the head in particular :

(a) By bleeding. — A copious and *sudden evacuation* of blood from a free orifice in the arm, to be repeated if necessary, proportioning the quantity to the age, sex, temperament, and habit of the patient. This may be followed up, if necessary, by topical depletion, by cupping or leeches to the temples, or by opening the temporal artery.

(b) By active purging with castor oil, or with a full dose of calomel and jalap, given at the outset, followed by five-grain doses of calomel every two, three, or four hours. [One of the most prompt and efficacious cathartics in all kinds of inflammatory affections of the brain is croton oil.]

(c) By depressants, in doses short of inducing vomiting. Of these, the tartar-emetic is the best. It may be given in doses of a sixth to a fourth of a grain, cautiously increased, and at frequent intervals, and may be usefully combined with the calomel.

(d) By counter-irritants to the extremities, as the mustard poultice or a large blister to the inside of the thighs, hot water to the feet, &c.

(e) By strict antiphlogistic diet : no food whatever should be allowed during the inflammatory period, except barley-water, rennet-whey, gruel, sago, panada, arrow-root, or the like.

(f) By local applications, as cold lotions constantly renewed, or ice to the head ; or (and this is to be preferred to all other means of applying cold) a stream of cold water poured upon the head.

(g) By complete rest and perfect quiet. The most perfect tranquillity should be observed in the patient's room, all loud sounds and light being carefully excluded ; the head should be raised by pillows.

II. *During the period of Torpor or Collapse*. — If the patient

has not been already bled, or if the pulse remains hard and frequent, general or local abstraction of blood is indicated, proportioned in quantity to the remaining strength of the patient. Purgatives must also be given with the same precaution. Counter-irritation may be used in combination with the other measures, or, when the strength of the patient is greatly exhausted, alone. When the symptoms of excitement have passed away, and insensibility or general torpor remains, a blister to the scalp will often be attended with great benefit. In extreme collapse, ammonia, wine, and brandy must be given, with beef-tea and nourishing food, and opium or laudanum may be cautiously administered, its effect being narrowly watched. The state of the bladder must be carefully inquired into at every visit, and if retention of urine exist, the water must be frequently drawn off.

III. *During the period of Convalescence.*—The patient must be narrowly watched, the diet must be carefully regulated, the bowels must be kept free by gentle purgatives, and the patient should not be allowed to resume his ordinary occupations till his health is quite re-established. On the occasion of any slight relapse, cold applications to the head, counter-irritants, and more active purgatives may be resumed. If the mind does not recover its tone, but the memory is impaired, and the patient remains weak and irritable, the cold douche or the shower bath, with or without blisters to the scalp, or a seton in the neck or arm, may be employed with great advantage.

The disease may be symptomatic of intestinal irritation in children, or of remote visceral disease in adults: and here the ordinary measures must be employed, at the same time that the local irritation or disease is attacked. When it is caused by wounds or injuries to the head, or when it follows congestion, caused by narcotics, the treatment must be conducted on the same principles as that of the idiopathic form.

MENINGITIS—INFLAMMATION OF THE MEMBRANES OF THE BRAIN.

Under this head are comprised inflammation of the arachnoid and pia mater, usually designated *meningitis*; inflammation of the arachnoid alone, called *arachnitis*; and inflammation of the dura mater. Cases of pure *arachnitis* are of such extremely rare occurrence, and their symptoms differ so little, if at all, from those of mixed inflammation of the arachnoid and pia mater, that a separate description of the symptoms of *arachnitis* is alike difficult and unnecessary. Meningitis, or inflammation of the arachnoid and pia mater, and inflammation of the dura mater, are the only diseases which it is proposed to describe under the general title of meningitis.

INFLAMMATION OF THE ARACHNOID AND PIA MATER.

SYMPTOMS.—This disease commences differently in different cases. Sometimes it begins with sudden and violent pain in the head, with loud screaming, which is followed by convulsions. In other instances it also commences suddenly, with a long-continued paroxysm of general convulsions. In a third class of cases its attack is less sudden, the convulsions being preceded for two or three days by a general feeling of discomfort, slight headache, nausea, and vomiting. The convulsions are soon followed by coma, which ends fatally after a variable period of from one to five or six days. The pulse is sometimes natural in frequency, sometimes less frequent than in health, and in other cases, again, it is described as small and frequent. Strabismus is occasionally present, and in some cases the patient is delirious. In these latter instances, the disease is probably complicated with inflammation of the substance of the brain. (See Phrenitis.)

INFLAMMATION OF THE DURA MATER.

SYMPTOMS.—Pain in the head, fever, and rigors, which often recur at regular intervals, and simulate ague. The intellectual faculties are at first but little affected, but during the progress of the disease the patient often falls into a state of coma. If the inflammation extends to the other membranes, or to the substance of the brain, the symptoms proper to inflammation of those parts show themselves. The disease is very rarely idiopathic, but follows on injuries to the scalp or bones of the head, or on inflammation of the internal ear.

For the **TREATMENT** of these diseases, see Phrenitis.

HYDROCEPHALUS—WATER IN THE HEAD.

VARIETIES.—1. Acute ; 2. Chronic.

ACUTE HYDROCEPHALUS.

SYMPTOMS.—This disease, like inflammation of the brain and its membranes in the adult, begins differently in different cases. Sometimes it is preceded, for a considerable period, by languor, inactivity, loss of appetite, nausea, vomiting, parched tongue, hot dry skin, flushing of the face, and other symptoms of pyrexia, or by the symptoms of infantile fever (see Infantile Fever, p. 214). In a second class of cases, it begins suddenly with the symptoms of inflammation of the brain and its membranes in the adult (see Phrenitis, p. 272). In a third class of cases, again, it comes on slowly and obscurely, in the course of febrile disorders or of the exanthemata. The disease itself is characterized by acute darting

pains in the head, occurring at intervals ; pain over the eyes ; great sensibility to light ; suffused redness of the eyes ; flushed countenance ; contracted pupils ; extreme restlessness ; frequent sighing ; disturbed sleep, from which the patient often starts screaming ; the gait is tottering ; the hand is often raised to the head ; the pulse is small, quick, and frequent ; the tongue coated ; there is nausea or vomiting ; the bowels either obstinately confined or unusually loose, with foetid evacuations. Delirium and convulsions are sometimes combined with these symptoms of the stage of *excitement*. After a variable, and often a considerable period, the violence of the symptoms begins to subside, the pain becomes less acute, a constant low moaning takes the place of the shrieks ; the pupils dilate ; strabismus is often present ; an uneasy sleepiness succeeds a constant state of watching ; the pulse, before increased in quickness, is now preternaturally slow and often intermitting ; the strabismus increases ; the pupils become more dilated, and cease to contract on being exposed to light ; and double vision or complete loss of sight, with lethargic torpor, succeed.

After a shorter or longer continuance of the second stage, the pulse again returns to a febrile state, and becomes so extremely small and rapid as scarcely to be numbered ; there is extreme difficulty of breathing ; stertor supervenes ; the evacuations become involuntary ; maculæ sometimes appear about the joints, and in different parts of the body ; and at length the patient expires in dreadful convulsions.

CAUSES.—*Predisposing*.—Childhood ; general debility ; scrofulous diathesis.

Exciting.—Intestinal irritation ; dentition ; metastasis of eruptions on the scalp or body ; febrile and exanthematous disorders.

DIAGNOSIS.—The most prominent symptoms are, the excruciating pain in the head, flushed face, restlessness, and fever, followed by strabismus, dilated pupil, and profound stupor ; the pulse at first preternaturally quick, afterward becoming inordinately slow or intermitting, and then again increasing in frequency. To this rule, however, there are marked exceptions. It is necessary to distinguish this disease from one of an opposite character, called *spurious hydrocephalus*, which has the following characters : a pale cheek, a cool or cold skin, an expression of great languor, and an absence of febrile symptoms, or, at the most, an occasional and transient flushing of the face. On inquiry, the child will be found to have suffered from loss of blood, or from long-continued diarrhœa.

PROGNOSIS.—Very unfavorable, more especially where the coma is great, with total loss of sight, and weak, intermitting

pulse; the head greatly enlarged, apoplectic stertor, difficult respiration, and involuntary evacuations.

TREATMENT—Indications.—I. To subdue inflammation, when it supervenes upon other diseases. II. To remove existing sources of irritation.

The inflammation is subdued by,

1. Bleeding; the application of leeches to the temples or neck, opening the temporal artery. In very young children, leeches to the temples or behind the ear will answer every purpose of venæsection or arteriotomy.

2. Cathartics; of jalap, and submuriate of mercury.

Half a drop, or a drop, of the oleum crotonis is a sure purge, which may be disguised and given to children when other medicines are refused.

3. Antimonial preparations. Calomel, in doses of two or three grains, every two or three hours, either alone or in combination with tartar-emetic, in doses of one eighth to one sixth of a grain or more, is perhaps the best remedy. Children bear purgatives, and especially mercurial purgatives, well.

4. Cold applications to the head; cloths wetted with cold water, or vinegar and water, which may be made very cold by ice, or solutions of muriate of ammonia and nitrate of potass. Cold water dropped on the head. The head should be raised, and the effect of the cold to the head may be increased by immersing the lower extremities, or the body of the patient, in warm water.

The second indication is fulfilled by the use of aperients and alteratives to free the alimentary canal, and correct the secretions, and by the free use of the gum lancet, if the teeth are the source of irritation.

5. Counter-irritants, as mustard poultices, or blisters to the thighs, chest, or back of the neck.

CHRONIC HYDROCEPHALUS.

SYMPTOMS.—Children are sometimes born with this disease. It takes place at all periods between birth and the age of eight, very seldom after, and is known by drowsiness, languor, strabismus, vomiting, costiveness, coma, and convulsions; the bones of the head separate, the fontanels enlarge, and the head acquires an immense size.

CAUSES—Predisposing.—Infancy; the scrofulous diathesis.

Exciting.—Injury to the brain during labor; tumors within the cranium; the causes of other dropsies; dentition, irritation in the intestinal canal. It is also a consequence of the acute form.

DIAGNOSIS.—The history of the case, the large size of the head, and the prominence of the fontanels.

TREATMENT—*Indications*.—I. To promote the absorption of the effused fluid. II. To improve the general health.

The first indication is fulfilled by,

1. Counter-irritants ; blisters to the head, kept open for days or weeks by the unguentum lyttæ or sabinæ, or a plaster of wax and tartar-emetic, or frictions with tartar-emetic ointment, **or an issue over the fontanel.**

2. Mercury ; applied externally, and given internally, so as to affect the mouth.

3. Diuretics of squills, digitalis, and submuriate of mercury, as recommended for anasarca.

The second indication is fulfilled,

1. By a careful regulation of the diet, according to the age of the child.

2. By tonics, such as quinine, and the preparations of iron.

3. By a change of air, especially if the patient inhabits a low and damp situation. The sea-side, or a dry and bracing inland situation.

When depletion, leeching, warm bath, sinapisms, blisters, and purgatives have failed, and the pupils are dilated, the respiration stertorous, the limbs convulsed or paralyzed, together with coma, and an extremely frequent or slow pulse, effusion has probably taken place, and we must endeavor to arrest or diminish it by promoting absorption, and by causing powerful revulsion. This is effected by blisters, antimonial ointment rubbed into the neck and behind the ears, and mercurial frictions at the angles of the jaws and over the scalp. We should also exhibit calomel freely, in doses of three or four grains every three hours, so as to act freely on the bowels, and to affect the system, if possible. It is extremely difficult, however, to produce salivation in hydrocephalus. So much as 500 grains have been administered without causing ptyalism. It may be combined with James's powder, or with the tartar-emetic.

Nauseating doses of tartarized antimony, given every hour, have been strongly recommended. The dose may be from a twelfth to an eighth of a grain, cautiously increased, according to the age. Vomiting should be carefully avoided in inflammations of the brain or its membranes. It often happens that the disease lingers for a long time, and that the digestive functions are unaffected. In such cases, a mild, nutritious diet, composed of sago, arrow-root, tapioca, and light puddings, may be allowed ; and if there be much prostration of strength, a tea-spoonful of some of the white wines. Sherry or Madeira, may be given at short intervals throughout the day. The disease now assumes a chronic form, and may continue for months or years, unless tapping be resorted to, which may effect a cure.

Successiveappings of the brain for the removal of the fluid, followed by compression, have been practiced with complete success, and compression alone has proved successful in one or two cases.

[The credit of first operating on the head for the cure of chronic hydrocephalus is due to Dr. Vose, formerly of New York, who proposed this method of cure in the year 1806.]

PROGNOSIS.—The disease generally ends fatally; though, after the bones begin to separate, its fatal termination is protracted. Death is commonly preceded by convulsions.

Parents often express anxiety about the large size of their children's heads, and they are sometimes told that the enlargement is due to water on the head. As this question is often put to the medical man, it is well that he should be cautioned not to attribute a large head to this cause, unless the increased size is accompanied by other decided symptoms of the disease.

[HYDRENCEPHALOID DISEASE.]

This disease bears a very striking resemblance to ordinary hydrocephalus from inflammatory action, but differs from it in its depending upon an opposite condition of the brain, there being a deficiency of blood in the system, and a general state of exhaustion.

SYMPTOMS.—It is a disease of childhood, and is accompanied by irritability and great delicacy of the frame. The pulse is frequent, skin heated, respiration quick and sighing; fretfulness and peevishness characterize the child in all its actions. These symptoms, although not uniformly present, are the premonitions usually found in this disease, and indicate a state of system unfavorable to evacuations of any kind. When the disease is present, the child lies quietly, as if partially asleep, occasionally opening and closing its eyes; no interest is manifested by the patient in any surrounding objects, not even for light, though it be brought near the pupil; there is a paleness of the surface and a coldness of the cheeks; the respiration becomes slow and feeble, with the sound of mucus in the trachea, and at times a dry, husky cough. These symptoms increase until there is a perfect coma.

CAUSES.—A deficiency of blood in the general system; an impoverished quality of the blood, whereby it fails to stimulate properly the brain; excessive and unnecessary bleeding, injudicious use of purgatives, exhaustion from want of food, &c.

TREATMENT.—When these symptoms arise from hemorrhage, stimulants are required, as wine-whey, arrow-root, and

wine or brandy ; a few drops of aqua ammoniæ in an ounce or two of water ; breast milk, given with a spoon when the child can not suck ; to check diarrhœa, chalk mixture with camphorated tincture of opium ; warm flannels, and frictions to the bowels, gently applied while the patient is exposed to an elevated temperature. While the skin continues cool, a recumbent posture must be continued ; a disregard to this might be suddenly fatal. A blister to the neck, and similar external irritants to the other parts of the body, will be found highly useful in restoring action to the system.]

APOPLEXIA—APOPLEXY.

Species.—1. Simple or congestive apoplexy ; congestion of the vessels of the brain without rupture ; 2. Hæmorrhagic apoplexy, or congestion with rupture ; and, 3. Serous apoplexy, or congestion with serous effusion.

SYMPTOMS.—This disease makes its attack in one of three ways : suddenly, the patient falling down without warning, as if from a blow ; after a short premonitory stage, consisting of acute headache, sickness, and faintness ; or with sudden hemiplegia. In whatever way it may commence, the fit is characterized by complete insensibility, accompanied by slow and noisy, or stertorous and puffing breathing ; impeded deglutition ; flushed and livid countenance ; prominent and motionless eye, with (generally) a contracted pupil ; the limbs are either motionless or rigid, or convulsed, or these several states exist on one side, or in one limb, and not on the other or in the rest. The bowels are either obstinately confined, or the evacuations are passed involuntarily ; the urine also is either passed involuntarily, or, being retained till the bladder is full, dribbles away. The pulse is full, strong, and quick, but sometimes more and sometimes less frequent than natural.

Apoplexy is sometimes preceded for a considerable period by premonitory symptoms, such as giddiness, headache, a sense of pressure and constriction in the head, confusion of ideas, incoherence, loss of memory, faltering speech, hæmorrhage from the nose, flashes of light, noises in the ear, visual spectra, double vision, transient blindness or deafness, drowsiness, numbness of the extremities, pallor, nausea, vomiting, and faintness.

TERMINATIONS.—Suddenly in death ; in death, after a variable interval ; in complete recovery, which is commonly preceded by vomiting and profuse perspiration ; in partial recovery, with more or less impairment of mind, and more or less extensive paralysis.

CAUSES—Predisposing.—A certain age : from the fiftieth to

the eightieth; the liability increases as the age advances. Few cases occur under twenty, and very few indeed in childhood. A certain make of body, combining a short, thick neck, large chest, and stout person; but the disease sometimes occurs in persons of the very opposite conformation; hereditary tendency; indulgence in the luxuries of the table; suppression of usual evacuations; intense study; sedentary life; plethora, however induced; hypertrophy of the left ventricle of the heart; diseases of the valves of the heart; metastasis of gout or rheumatism; and repression or non-appearance of exanthematous eruptions, as variola, rubeola, or scarlatina.

Exciting.—Violent exercise; strong expiratory efforts, as in singing and playing on wind instruments, straining at stool, &c.; sudden emotions and violent passions of the mind; exposure to intense cold or heat; sudden or long stooping; pressure on the neck; venereal excesses; overloading the stomach; certain narcotic substances, such as opium, alcohol, and the narcotic gases.

DIAGNOSIS.—From the effect of spirituous liquors, by the odor of the breath; from the effect of narcotic poisons, by the history of the case. In narcotic poisoning the patient can often be roused for a short time.

PROGNOSIS—Favorable.—Youth. The senses a little impaired; the function of respiration not much affected; hæmorrhage from the nose or hæmorrhoidal vessels; diarrhœa; profuse perspiration; a sudden attack, if not immediately fatal, as compared with an attack preceded by premonitory symptoms of long continuance.

Unfavorable.—Protracted beyond the third day; increased frequency of pulse from the first, or after an interval. Any of the characteristic symptoms in a very marked form; involuntary evacuations; retention of urine; cold extremities; cold and clammy sweats.

ANATOMICAL CHARACTERS.—In *congestive* or *simple* apoplexy, distention of the veins of the brain, with or without effusion into the ventricles, or at the base of the brain. In the *hæmorrhagic apoplexy*, effusion of blood in the substance of the brain, into the ventricles, at the base, or on the surface: in *serous* apoplexy, effusion of serum in the ventricles, or under the arachnoid, on the surface, or at the base of the brain.

TREATMENT.—During or immediately after the fit. The first thing to be done, in all cases, is to loosen the patient's neckerchief and shirt collar, raise his head, or place him, if convenient, in a chair, and open the window of the apartment. If the face is turgid and the eye injected, or if the face being pale, the pulse is full, hard, and jerking, we open

a vein, and allow the blood to flow till the approach of syncope, taking care that the patient does not faint. If, on the other hand, the face is pale, and the pulse feeble and intermittent, the patient must be treated as if he were in a fainting fit, and the bleeding must be postponed till decided reaction has occurred, and the symptoms just stated have shown themselves.

In the after treatment, the *indication* is to reduce the action of the heart, and diminish the force of the circulation through the brain.

1. By bleeding from the arm at intervals, from a small orifice, in the semi-erect position, and with constant reference to the effect produced upon the pulse, and aspect of the patient, whenever, and so long as there are evidences of fullness of blood, or excitement of the circulation. The paleness of the countenance must not prevent us from bleeding when the pulse is strong; nor the weakness of the pulse when the face is turgid, and the eyes injected.

2. The application of leeches and cupping-glasses.

3. Drastic purgatives, of which croton oil, in doses of one or two drops, is the most easily used and most efficacious. Purgative enemata.

4. Cold to the head, if the surface is hot.

5. Counter-irritants to the back of the neck and legs, and, after a time, to the scalp.

6. A strictly regulated diet, consisting at first of simple farinaceous food, for which a more generous diet must be cautiously and gradually substituted.

When apoplexy arises from suppression of the menstrual or hæmorrhoidal flux, we should apply leeches to the vulva or about the anus. When there is profound coma or collapse, we should apply irritating liniments to the legs, thighs, and neck, and if these fail, and life is nearly extinct, we should pour boiling water over the extremities, or apply nitric acid to the nucha: the hot-air bath, or stimulants, in such cases, have produced reaction; and when this happens, depletion may be necessary.

If the patient can not swallow, great care is required lest any thing get into the glottis and cause suffocation; and when this is likely to happen, all attempts should be abandoned, and external means trusted to.

7. If the disease take place soon after a full meal, an emetic, or irritating the fauces, should be employed.

In this disease, as in the last stage of typhus or coma, we must examine the hypogastrium daily, and draw off the urine if necessary. When apoplexy supervenes after a retrocession of gout or of acute rheumatism, we should irritate the site of

the latter disease by sinapisms, blisters, warm turpentine, or antimonial ointment : depletion in such cases is generally injurious. When convalescence commences, we should regulate the bowels, employ counter-irritation on the neck, insert an issue or seton in that situation, or in the middle of the arm, or on the external surface of the knee. When paralysis ceases in one limb and seizes another, we must resort to general and local bleeding, counter-irritation, purgatives, &c., provided the general symptoms justify the use of active measures.

For the treatment of paralysis following apoplexy, see Paralysis.

PROPHYLAXIS.—As apoplexy depends on a determination of blood to the head, and generally on a plethoric habit, we should advise a total abstinence from ardent or fermented liquors, spirits, wines, porter, ale, &c., great moderation in the use of animal food, and careful avoidance of all food which is either difficult of digestion, or which the patient may have found to disagree with him. In extreme cases, a vegetable or a milk diet must be insisted on ; and on the recurrence of symptoms threatening apoplexy, a greater strictness of diet, a more open state of the bowels ; and if these do not remove the symptoms, dry cupping to the neck, or the abstraction of blood, by cupping, from that part, must be resorted to. Hot rooms and late suppers must be avoided. The patient should take regular exercise in the open air, and the bowels should be kept regular. The patient should wear nothing tight about the neck or waist.

In the treatment of apoplexy in all its stages, it is important not to carry depleting measures to an extreme. An undue activity in this respect has doubtless led to fatal consequences.

CHRONIC DISEASES OF THE BRAIN.

There are several chronic diseases of the brain, as softening, induration, hypertrophy, atrophy, abscess, scrofulous and other tumors. The symptoms and diagnosis of these diseases are extremely obscure and uncertain, and the same symptoms may be present in very different states of the organ.

It would, therefore, answer no good purpose to enter into a minute description of them. The presence of convulsions, rigidity or paralysis of the limbs, would indicate disease of the brain or spinal cord ; similar affections of the muscles of the face, paralysis of the muscles of the tongue, affections of the organs of sense, and impairment of the several faculties of the mind, would indicate disease of the brain. The nature of the disease may also sometimes be inferred from the history of the case. Thus, the presence of tubercles in the lungs, or in the

peritoneum, would lead to the inference that any existing disease of the brain might be of a scrofulous nature; and so of other malignant degenerations. Individual symptoms, too, furnish a probability of particular diseased conditions. Thus, general and long-continued convulsions afford a probability of inflammatory softening of the brain. Extensive paralysis, of a more chronic form of the same disease. The treatment of all such cases must be guided by existing symptoms and the state of the constitution.

In many cases chronic diseases of the brain are unattended with any symptoms which could lead us to suspect their existence. Thus, we have it on the authority of Louis, that out of twenty cases of fungus of the dura mater, three only had cerebral symptoms of any kind; and chronic abscesses, hydatids, cysts, exostoses, &c., sometimes attain uncommon size, without any attendant symptoms of cerebral disorder.

Consult Abercrombie on Diseases of the Brain, and Watson's Lectures, vol. i., p. 469 and seq.

CEPHALALGIA—CEPHALÆA—HEADACHE.

Headache is a symptom of almost all acute and chronic diseases of the brain, as well as a distinct functional derangement of very frequent occurrence.

SPECIES.—(a) External, (b) Internal.

(a) External. 1. Cephalalgia muscularis; 2. Cephalalgia periosteosa; 3. Cephalalgia neuralgica.

(b) Internal. 1. Cephalalgia congestiva; 2. Cephalalgia dyspeptica, vel sympathetica. 3. Cephalalgia organica.

EXTERNAL.—1. *Cephalalgia muscularis*, or pain of the muscular covering of the head, affects the occipito-frontalis and temporal muscles. *Diagnosis*.—The pain is diffused over the head, remitting in character, increased by motion of the eyebrows and jaws, by pressure, and by percussion with the fingers. It is generally accompanied by pain in the face, neck, shoulders, or other parts of the body. *Cause*.—Exposure to cold. *Treatment*.—That of muscular rheumatism. In very severe cases, leeches or a blister to the back of the neck.

2. *Cephalalgia Periosteosa*.—Seat, the pericranium. *Diagnosis*.—Pain extending over the entire head, or limited to one spot, increased by firm and deep pressure, but less affected than the preceding form by motion of the surrounding muscles. It generally affects the periosteum of the face at the same time, so that the nose is tender to the touch; and it sometimes extends to other parts of the body. It is generally accompanied by some cerebral excitement, and slight symptoms of dyspepsia. When limited to one spot, it is commonly attended with swelling. *Causes*.—Over-excitement of the

brain, from anxiety of mind or intense application, combined probably with the effect of cold. In such cases the pain is generally diffuse. When the pain is limited to one spot or to a few points only, it is often traceable to a syphilitic taint, and will be found to coexist with, or to have followed, similar affections of other bones. *Treatment*.—Depends on the existing state of the circulation through the brain, and on the state of the general health. If the scalp is hot, leeches, aperients, and antimonials. If it is traceable to syphilitic taint, the iodide of potassium in five-grain doses, three or four times a day. If the bone beneath seems to be affected, free incisions will be necessary.

3. *Cephalalgia Neuralgica vel Periodica*.—Seat, the nerves of the integuments of the internal angle of the orbit and side of nose (megrin), or of one side of the head and face (hemisrania). *Diagnosis*.—Its periodic character, which resembles that of an ague, and occurs with the same regularity at variable intervals of one day or more, or even of weeks or months. In this it differs from the two former species and from common tic douloureux. In many cases the disease is not distinctly intermittent, but characterized by being bounded by the central line of the head and face. *Cause*.—Exposure to cold and wet; marsh miasma. *Treatment*.—The same as for ague, viz., quinine or liq. arsenicalis. The treatment is the same, whether the disease is distinctly intermittent or merely limited in the manner just stated. The general health must at the same time be attended to.

INTERNAL.—1. *Cephalalgia Congestiva*, or *Congestive Headache*.—This presents itself in three different states of constitution: the plethoric, the delicate and irritable, and the weak and leucophlegmatic. *Diagnosis*.—Obtuse pain, affecting the whole of the head, especially the forehead and occiput, combined in the plethoric with the bloated countenance, the full red eye, the distention of the veins, the full pulse, and a dull and heavy expression of face; in the delicate and irritable, with flashes of light, floating specks before the eyes, noises in the ears, cold extremities, and small, frequent, quick pulse; in the subjects of *anæmia*, with pale skin, lips, tongue, and gums, cold extremities, palpitation of the heart, violent throbbing of the carotid arteries, and small, frequent, quick pulse. In the two latter cases, it is brought on in violent paroxysms, by sudden noises, mental emotions, or any violent muscular exertion. *Treatment*.—In the plethoric, depletion by bleeding, general and local, cautious regulation of the diet, and aperients frequently administered; in the delicate and irritable, by repose of mind, careful attention to the state of the stomach and bowels, and by small doses of narcotic medicines; in the subjects of *anæ-*

mid, steel in full doses; or, where there is great debility, stimulants. Where there is *anæmia*, there steel may always be safely given; when much blood has been lost, stimulants may be given with equal safety.

2. *Cephalalgia Dyspeptica vel Sympathetica*.—*Diagnosis*.—Pain usually fixed, and seated in the left temple, or over the right eye, or on the top of the forehead. It commonly commences when the patient first rises in the morning, and in slight cases continues till after breakfast; in more severe ones, it begins as a diffuse heavy pain, and gradually becomes fixed in one spot, accompanied with nausea, sickness, and vomiting. There is also confusion of thought, dimness and indistinctness of vision, and ringing in the ears. Sometimes the fit is removed by free evacuation of ingesta, or frothy mucus or bile from the stomach. Its duration varies from some hours to three or four days, and in confirmed cases it returns at short intervals, and is attended with most severe suffering. Sometimes there is much flatulence present, and relief is only afforded by free eructation. *Cause*.—Derangement of the functions of the stomach and bowels. The bad habit of taking physic day by day, by which the tone of the entire alimentary canal is weakened. *Treatment*.—Gentle aperients in combination with alkalies, as rhubarb with soda, or magnesia, or the dinner pill. Regulation of the diet; proper exercise; emetics, where the cause is transient. In cases of obstinate sick-headache, emetics of ipecacuanha may be administered every morning with the best effect. If the pernicious habit of taking physic have been formed, it should be broken through, for though strong aperients often give relief for the time, they always aggravate the disorder. If large quantities of bile are ejected from the stomach (bilious headache), small doses of calomel, or hyd. c. cretâ, as a quarter of a grain of the first, or a grain of the second, administered three times a day, will be found useful. When the bowels are very irritable and act irregularly, the best purgative is a combination of the compound rhubarb pill, with extract of conium. When much flatulence is present, ginger or alun may be combined with the other medicines, or strong mint-water may be made the vehicle of saline aperients. Cold to the head sometimes acts as a palliative.

3. *Cephalalgia Organica*.—*Diagnosis*.—Difficult when the pain is unattended by any morbid affection of the senses or moving powers. The pain is generally more fixed and deeper-seated than in other forms of headache, more affected by motion and change of posture, by heated rooms, noise, and mental application. If accompanied with disordered digestion or with sickness, it is not relieved by vomiting. Sometimes it is in-

termittent, and in such cases the diagnosis is more difficult still. The nature of the disease is at length made known by some affection of the senses, by paralysis, spasms, or convulsions. *Treatment*.—That of the disease of which it is the symptom. The state of the circulation through the brain must be carefully watched, and local and general blood-letting, purgatives, and counter-irritants must be employed, according to the existing symptoms, at the same time that strict attention is paid to the state of the general health. In obscure chronic affections of the brain, in which other remedies have failed, a course of mercury, carried to the extent of affecting the mouth, may, perhaps, suspend some chronic inflammation which is the cause of the existing symptoms.

Great caution is required in inquiring into the cause of headache, and in discriminating one form from another. On the closeness of this attention and the accuracy of the diagnosis, the treatment will entirely depend. Sometimes, for instance, a patient will complain of nothing but headache, but on careful inquiry his real disease will be found to be tubercular phthisis.—(G.)

Besides the causes of headache above enumerated, there are others too numerous to specify. An inflammatory headache and a metastatic headache might be added to the foregoing divisions, and many cases might be pointed out which do not come precisely under any of the above heads. Those forms of headache produced by the action of the narcotic and narcotico-acrid poisons belong to the class of congestive headache.

DISORDERS OF THE MIND.

MANIA	Furious Madness.
MELANCHOLIA	Melancholy.
HYPOCHONDRIASIS	Vapors—Low Spirits.
DELIRIUM TREMENS	Drunkard's Delirium.

MANIA—FURIOUS MADNESS.

SYMPTOMS.—This disease sometimes comes on suddenly, but more frequently slowly and almost imperceptibly, being preceded by a period of *incubation* of variable length, extending from some days or weeks to as many months or years. The symptoms of this period of incubation are an alteration in the thoughts, habits, tastes, temper, and affections, the patient becoming more and more the reverse of his former self. The general health suffers at the same time, the appetite fails, the sleep is disturbed, the bowels are confined or irregular, or affected with diarrhoea; the tongue is furred, the pulse frequent

and quick; the patient grows thin, and the features alter. There is often pain in the head, a distressing confusion of ideas, a failing of the memory, extreme irritability of temper, and a miserable consciousness of loss of mental power and change of character. Frequently, before the disease shows itself in its marked form, the bodily health improves, and the painful consciousness of unsoundness of mind disappears.

After these symptoms of the period of incubation have lasted for a longer or shorter period, without forcibly attracting attention, some unusual excitement, or some circumstance in itself unimportant, brings on a decided attack of mania.

The symptoms of mania, whether beginning suddenly in consequence of strong excitement, or bodily disease, or coming on slowly after a long period of incubation, are the following: Anxiety, uneasiness, restlessness, sleeplessness, alternate excitement and depression, or continued agitation and violent muscular efforts, rapid incoherent discourse, fits of loud laughter, or loud shoutings, grinding of the teeth, spectral illusions, mental delusions, unfounded antipathy to certain persons, particularly to near relations or intimate friends. There is a peculiar wildness and fierceness of the countenance, the pupil is dilated, the eyelids widely open, the eyes glistening and unsteady, the features strongly marked, the countenance flushed. The patient will sometimes complain of severe pains in the head, giddiness, loud noises in the ears, and bright spots before the eyes. The sensations are generally more obtuse than usual, or they are disregarded, so that the patient will bear the most intense cold or heat, prolonged abstinence from food or drink, and long-continued want of sleep. The bowels are usually costive, and require strong aperients, the tastes often depraved, the appetite variable, the habits filthy; the tongue is dry and furred, the pulse increased in frequency, quick, and often full, and the skin often emits a peculiarly offensive odor. The disease is sometimes complicated with epileptic fits, or with symptoms of paralysis, or disease of the brain.

Many maniacs have lucid intervals, which recur with regularity. They are also capable, under certain circumstances, of considerable self-restraint, and of concealing their delusions or designs, and they will carry out their plans with the cunning of rogues, and the contrivance of sane men.

CAUSES.—Hereditary predisposition; violent and stimulating emotions of the mind; uncurbed and immoderate indulgence of the passions; violent exercise; frequent intoxication; excessive study; suppression of periodical and other evacuations; long-continued discharges; parturition or lactation; certain diseases of the brain; preceding attacks of epilepsy, fever, &c.

DIAGNOSIS.—*From Phrenitis*, by the latter being accompanied with fever, the former not. *From Delirium Tremens*, by the history of the case, the absence of trembling, the more violent excitement, the more complete incoherence.

PROGNOSIS.—*Favorable.*—The mania arising in consequence of some other disease, or from some temporary cause, as occasional excitement of the mind, or a single indulgence in spirituous liquors; the attacks being slight, and not frequent in their recurrence; youth; hæmorrhage; diarrhœa; scabby eruptions; restored hæmorrhoidal or menstrual discharge.

Unfavorable.—Coming on after the middle period of life, or having been of long continuance; complication with epileptic fits, or with symptoms of paralysis.

TREATMENT.—During the period of incubation, the medical treatment must be determined entirely by the condition of the bodily functions. If there are symptoms of determination of blood to the head, they must be met by remedies suitable to that state; if the bowels are habitually confined, aperients must be regularly administered; if the secretions are disordered, the patient must be put under a course of alteratives; if there is great debility, tonic remedies are indicated; and if the habits of the patient are in any respect unfavorable to health, a change must be insisted upon. The habitual use of the shower bath, change of air, a nutritious and unstimulating diet, and regular hours for meals and rest, should be particularly enforced. The moral treatment will consist in removing as much as possible all causes of excitement, all unnecessary opposition to the patient's plans and wishes, great forbearance on the part of relations and attendants, an entire or partial abstinence from business, change of scene; and cheerful society.

Treatment of the Disease when fully formed.—The treatment of this, as of all mental disorders, must be partly medical and partly moral. The medical treatment must be regulated by the existing state of the patient's body and the ascertained cause of the disease. If the patient is plethoric, or there are decided symptoms of determination of blood to the head, bleeding, cupping, leeching, cold to the head, brisk purgatives, and low diet, must be prescribed. If the disease has supervened on suppressed discharges, the same treatment will be necessary. If, however, it has followed suppressed menstrual discharge, and anæmia is present, full doses of steel will be required. If it comes on in the course of another disease, and is in the nature of metastasis, an attempt must be made to re-establish that disease, or active counter-irritation, in imitation of it, must be employed. If, on the contrary, the face is pale, or the attack of mania has been preceded by loss of blood, debilitating

discharges, or exhausting diseases, tonics or stimulants, according to the degree of the debility, must be resorted to. In all cases allied to hysteria, the shock of cold affusion, or the shower bath, is highly advantageous.

The remedies which have been most recommended in the treatment of mania are, bleeding, general and local, purgatives, and the warm and cold baths. Depletion must be used with the precautions just pointed out; purgatives may always be given in the absence of diarrhœa; the warm bath when the skin is cold and the circulation languid; and cold, in its several modes of application, either to reduce inflammation or in the form of shock, to rouse the patient to salutary efforts of attention. When there are symptoms of determination of blood to the head, the ice-cap, while the patient is immersed in the warm bath, is highly advantageous. The rotatory swing is another remedy, which has been used with advantage in maniacal paroxysms.

The Moral Treatment.—In recent cases of mania, occurring in private houses or in hospitals, it is necessary to prevent the patient from offering violence to himself or others by the strait-waistcoat, or the coercion of powerful attendants. In chronic cases, and in lunatic asylums, personal restraint can often be foregone, and constant watchfulness, gentle and conciliating treatment, and occasional seclusion, may be substituted. Much depends upon gaining the confidence of the maniac, and keeping out of sight all irritating means of restraint.

The patient should be engaged in some exercise or pursuit that will employ at once the body and the mind, and thus divert the latter from pursuing one invariable train of thought. He should, therefore, be removed from those objects with which he was formerly acquainted, and out of reach of things and persons associated with the origin of his disease. In cases where there is a tendency to suicide, the most constant watchfulness is required.

Mania is but one of many disorders of the mind, but it is the one which the general practitioner is most likely to be called upon to treat. The other forms of mental unsoundness—viz., idiocy, imbecility, and dementia—fall under the care of those who devote themselves especially to the treatment of such disorders.

Idiotism consists in a defective development of some part of the brain, either at birth or before the full evolution of the understanding. In these cases the whole of the functions are defective, the general sensibility is but partially established, the limbs are emaciated, or often paralyzed or ill-formed, and the power of articulation is so defective that the individual

rather howls than speaks. There is no perceptible alteration of digestion, circulation, or respiration. Imbecility is but a form of this, with a higher degree of intelligence.

Cretinism is a variety of idiotism endemic in parts of Switzerland, and generally found in combination with goitre.

Dementia is a diminution of the powers of the mind, with weakness or loss of memory, incoherence of ideas and actions, which have no determinate object. This disease most commonly occurs to persons advanced in life, and is not accompanied by fever, or any disturbance of the organic functions. It is caused by some affection of the brain, as chronic arachnitis, and is generally incurable. In many cases it follows an attack of acute mania; in others it is produced by a sudden and violent mental shock.

MELANCHOLIA—MELANCHOLY.

SYMPTOMS.—This, in its well-marked form, is one kind of monomania. It is characterized by dejection of spirits, fondness for solitude, timidity, fickleness of temper, and great watchfulness. In one form of the disease the patient refers some bodily sensation to some imaginary and impossible cause, as living animals, or even persons, in the stomach or bowels. To this and to the less severe forms of this disorder the term hypochondriasis is often given. The mind pursues one certain object or train of thinking, which in general bears a near relation to the melancholic himself, or to his own affairs, creating the most groundless, yet anxious fear, and generally accompanied with a desire of terminating his existence; it is often accompanied by disorder of the digestive organs, with flatulence and costiveness.

CAUSES.—*Predisposing.*—An hereditary tendency to insanity; the melancholic temperament in an exquisite degree.

Exciting.—Long-continued disease of the liver and organs of digestion; suppressed evacuations or cutaneous eruptions; distress of mind; sudden mental shocks; anxiety; excessive evacuations; intemperance in the use of spirituous liquors.

PROGNOSIS.—*Favorable.*—The absence of hereditary predisposition to insanity; the previous short duration of the disease; the reappearance of habitual evacuations, or diseases of the skin; sound sleep.

Unfavorable.—The disease being the effect of hereditary predisposition, or of the melancholic temperament exquisitely formed; its being of long standing, or supervening on epilepsy or palsy.

TREATMENT.—The *medical* treatment consists in regulating the functions of the stomach and bowels by aperients and alteratives; in the use of remedies adapted to the existing

state of the patient's constitution ; and of moderate exercise, the shower bath, fresh air, &c.

The *moral* treatment consists in changing the scene, amusing the mind, and diverting the attention as much as possible from the existing train of thought ; traveling, rural sports, society, conversation on favorite topics, and music, may be recommended, according to the taste of the patient, his previous habits of life, and the experience of his friends or attendants. Patients who betray the slightest tendency to suicide must be closely and constantly watched.

HYPOCHONDRIASIS—VAPORS—LOW SPIRITS.

SYMPTOMS.—Dyspepsia, dull pain in the hypochondria ; languor, listlessness, want of resolution and activity, disposition to seriousness, sadness, and timidity as to future events ; an apprehension of the worst and most unhappy state of them, and therefore, upon slight grounds, a dread of great evil. Particular attention to health ; and upon any unusual feeling, a fear of imminent danger, and even of death itself.

CAUSES—*Predisposing*.—The melancholic temperament.

Exciting.—All the causes of dyspepsia ; painful impressions upon the mind ; distressing events.

DIAGNOSIS.—From *Melancholia*, in degree, and in the more constant coincidence of dyspeptic symptoms. From *Dyspepsia*, by the affection of the mind being greater, that of the stomach less, than in idiopathic dyspepsia.

PROGNOSIS—*Unfavorable*.—The melancholic temperament exquisitely formed, complication with other diseases, the previous long continuance of the disease.

TREATMENT.—That of dyspepsia and melancholia combined (see those diseases). The patient will expect to be attended to in all his complaints. He must, accordingly, be humored and indulged, and will generally experience satisfaction from taking medicine.

DELIRIUM TREMENS.

SYMPTOMS.—Sleeplessness ; restlessness ; delirium, during which the patient recognizes those about him, answers questions rationally, and does hurriedly what he is told to do ; trembling of the lips, hands, and muscles is generally present, and more particularly in speaking, or on making any effort. The patient talks incessantly, and evinces a great anxiety to be doing something ; he fancies that he is surrounded with enemies, or that he is in a strange place, from which he is constantly endeavoring to escape ; or he thinks that some great evil is impending, or has actually befallen him. He is suspicious of those about him, and is tormented with frightful

images or sounds ; and will often be found busily looking, in unlikely places, after some object or other, on which his mind is intent. He is rarely violent, at least in the best marked cases of the disease ; but he sometimes exposes himself to danger in endeavoring to effect his escape. There is profuse perspiration, a moist and slightly furred tongue, and a frequent pulse. In fatal cases the delirium is often replaced by coma, the tremor passes into subsultus tendinum, and the evacuations become involuntary. In other cases the coma is rapidly followed by embarrassed respiration, mucous râle, and death by apnœa. The disease is very apt to recur.

POST-MORTEM APPEARANCES.—Effusion of serum, in the ventricles, at the base of the brain, under the arachnoid, or in all these situations ; injected state of the pia mater. Alcohol has been detected in the serum of the ventricles.

RATIONALE.—A loss of tone in the capillary vessels of the brain, leading to the appearances and results of inflammation, and restored only by resuming the same or a similar stimulus to that by which the altered state of the vessels was originally produced.

CAUSES—*Predisposing*.—Habitual indulgence in spirituous liquors ; and in opium or in other poisons belonging to the class of narcotics and sedatives ! mental exhaustion from intense study or prolonged anxiety. The male sex ? (this point, for obvious reasons, can not be accurately determined.) The summer season. *Exciting*.—An occasional debauch ; continued intemperance ; sudden abstinence from an accustomed stimulant ; loss of blood ; all causes of debility ; shock, physical or mental ; severe wounds (delirium traumaticum). Diseases occasioning or ending in great exhaustion.

DIAGNOSIS.—From *Meningitis*, by the previous history ; by the absence of headache ; by the ease with which the patient may be roused ; by the trembling of the hands ; by the absence of febrile symptoms. The distinction between meningitis and a form of delirium tremens coming on after a single debauch, or a comparatively short indulgence in habits of intoxication, is not so easily made, and, in extreme cases, the history of the patient and of the existing attack will be our only guide to treatment. When the respective diseases are well marked, there is no difficulty in the diagnosis.

PROGNOSIS—*Favorable*.—If depletion has not been previously practiced to an undue extent, or if the treatment has not been too long delayed.

TREATMENT—*Indication*.—I. To procure sleep. II. To reduce inflammation in those cases in which inflammatory symptoms are present.

I. This indication is fulfilled by full doses of opium, lauda-

num, morphia, or other preparations of opium. Two or three grains of solid opium, or from half a drachm to a drachm of laudanum, followed, at intervals of one, two, or three hours, by a grain of opium, or from twenty drops to half a drachm of laudanum, till sleep is procured, is the appropriate treatment; other preparations of opium, in equivalent doses, may be substituted. The opium may be combined with ammonia, in doses of from five to ten grains, with wine, or with the accustomed stimulus of the patient.

II. Inflammatory symptoms, when they exist, must be treated by the moderate and cautious abstraction of blood, followed by opium, in combination with full doses of tartar-emetic. It is in this class of cases that the combined use of the preparations of opium and antimony is strongly indicated. In the absence of symptoms of inflammation, the appropriate treatment is by opiates and stimulants. Cold to the head and counter-irritants may also be used, where symptoms of inflammation exist. The bowels may be kept moderately open, but strong purgatives should be avoided.

The patient should be watched, but, if not extremely violent, ought not to be confined by the strait-waistcoat. One or two strong persons should be at hand for security's sake.

REMEDIES.—Calomel and opium. The calomel is counter-indicated. Digitalis? Opium and tartar-emetic; indicated when inflammatory symptoms are present.

[It has been found, from a large amount of experience in various parts of the United States, that the strictly opiate plan is not so successful as a mildly stimulating course. The extreme wakefulness is a strong temptation to administer morphia, or similar preparations. If these, however, do not produce a soporific effect immediately, they greatly aggravate the malady, and convert a moderate hallucination into a most violent raving. The numerical results of recoveries do not correspond in amount to those in which opium is altogether omitted. The best course is the administration of alcoholic stimulus in a lessened quantity, and gradually withdrawing it as the system acquires strength.]

DISEASES OF THE SPINAL CORD AND ITS MEMBRANES.

MYELITIS	Inflammation of the Spinal Cord.
ACUTE SPINAL MENINGITIS	Acute Inflammation of the Membranes of the Cord.
SUBACUTE SPINAL MENINGITIS . .	Spinal Irritation.
HYDRO-RACHIS	Spina Bifida.
SPINAL EFFUSIONS.	

The spinal marrow and its membranes are liable to the same diseases as the brain and its coverings: to inflammation (myelitis), followed by softening, suppuration, induration, effusion, &c.; to inflammation of its several investing membranes (meningitis); and to effusions of blood, hydrorachis, and tumors of the medulla spinalis and its tunics. To these may be added relaxation, incurvation, excuvation, and lateral inflection of the spine itself. It is important to bear in mind that the symptoms of these diseases, like those of inflammation of the brain and its membranes, are even less uniform than those belonging to diseases of other parts.

MYELITIS—INFLAMMATION OF THE SUBSTANCE OF THE CORD.

SYMPTOMS.—A dull, aching pain in the part affected; loss of sensation and voluntary motion, or numbness and impaired sensibility, with feebleness of the upper or lower extremities, or of both; or the nerves of sensation and voluntary motion are affected separately. Convulsive and tetanic affections of different parts of the body. There is no derangement of the intellectual faculties, unless when the inflammation extends to the brain. The symptoms vary with the seat of the disease.

When the cervical portion of the spine is affected, there is rigidity of the neck, permanent contractions or convulsions of the superior extremities, succeeded by paralysis with difficulty in swallowing, difficult respiration, and a sensation of tightness around the chest and in the epigastrium.

When the dorsal portion is affected, the body is sometimes agitated by continued convulsive motions; there are palpitations, difficult respiration, and sense of constriction in the abdomen.

When the lumbar portion is inflamed, there are similar affections of the inferior extremities; constipation and retention of urine, or involuntary evacuations; sometimes impotence, or inertia of the uterus.

In some cases the disease comes on insidiously, is unaccompanied by pain, and is finally succeeded by paralysis of

the bladder, rectum, and inferior extremities. It is sometimes confounded with lumbago, rheumatism, incipient spinal curvature, and neuralgia of the lower limbs.

CAUSES.—Blows and falls ; violent exertions ; exposure to wet and cold. Caries of the vertebræ ; scrofulous disease.

TREATMENT.—Leeches or cupping to the part affected, followed by counter-irritation in the neighborhood of the part, by blisters or the tartar-emetic ointment, aperient medicines, rest, constant attention to the state of the bladder, cleanliness, and the water bed, if necessary. In other respects, the treatment must be that adapted to the existing state and strength of the patient.

ACUTE SPINAL MENINGITIS—ACUTE INFLAMMATION OF THE MEMBRANES OF THE CORD.

SYMPTOMS.—Pain in the parts affected, increased by motion, percussion, pressure, or heat. The pain, which often closely resembles that of rheumatism, and is brought on, or increased, by motion, extends along the back, and to the limbs, which are sometimes painful to the touch ; or it shoots round the abdomen or chest. Rigors are also sometimes present. There are contractions of the back, and neck, and of the limbs, varying with the seat of the disease, and assuming the form of trismus, torticollis, partial or complete opisthotonos, and general tetanic spasms. Sometimes in the place of tetanic spasms there are convulsions, or the symptoms of chorea. There is a sense of constriction in the neck, abdomen, or chest, with urgent feelings of suffocation. To these symptoms are occasionally added retention of urine and obstinate constipation.

The progress of the disease is rapid, and generally proves fatal from the tenth to the fourteenth day.

TREATMENT.—Venæsection, leeches, and cupping to the part affected, followed by counter-irritants, active aperients, a strict antiphlogistic diet, and perfect rest. The state of the bladder should be ascertained, and the urine, if necessary, frequently drawn off. After general and local bleeding, the application of ice to the affected portion of the spine is likely to be attended with great benefit. For this purpose, it may be conveniently inclosed in a bladder. Counter-irritants may be, at the same time, applied in the neighborhood of the part. Benefit will also be derived from the use of mercury, so as to affect the system. When collapse supervenes, these measures are to be discontinued, and the strength must be supported by diffusible stimuli, and by stimulating injections.

When the disease becomes chronic, and there is paralysis with shaking or stiffness of the limbs, blisters, setons,

moxas, galvanism, and acupuncture may be used with advantage.

SUBACUTE SPINAL MENINGITIS—SPINAL IRRITATION.

SYMPTOMS.—Pain in the affected portion of the spine, increased by firm pressure, percussion, or heat. Pain in the left side under the false ribs, or in all the muscles of the chest, or muscular pain of the most acute kind over the whole of the abdomen, shortness of breath, palpitation of the heart, hysteria, nervousness, depression of spirits, irritable temper, disordered bowels, constipation, flatulence, and deficient, excessive, or depraved menstruation.

Sometimes these disorders, which are often of long continuance, are aggravated after marriage, but especially during lactation and pregnancy: the sufferer is constantly complaining of pains or unpleasant sensations of all the parts below the affected vertebræ.

On making firm pressure with the index and middle finger of the right hand on the vertebræ from the neck to the lumbar region, or striking the several vertebræ successively, we discover one or more painful points. On striking the vertebræ, the pains in the side, chest, or abdomen are immediately increased; or darting pains in those parts are produced, if they did not previously exist. In some instances, these superficial pains are accompanied by convulsive movements of the muscles of the trunk.

CAUSES.—*Predisposing.*—The female sex. This is a common disease in young females, and is sometimes associated with distortions of the spine.

Exciting.—Sedentary pursuits, tight lacing, want of active exercise, constipation, painful menstruation, leucorrhœa: the original cause and the effect continuing to react upon and increase each other. Spinal irritation may exist in other diseases, as in spasmodic asthma, chorea, &c. When the symptoms associated with spinal irritation are more severe than those now described, the disease belongs more properly to acute meningitis.

RATIONALE.—The tender state of the spine is the middle link between some remote irritation of the uterus or intestinal canal, and the pains in the muscles of the chest and abdomen. The irritation travels through the nerves of the part affected to the spine, where it first becomes sensible, and thence is reflected as pain to the muscles of the chest or abdomen. The connection of the muscular pain with the tender spine is evidenced by the effect of percussion of the spine in producing or increasing it, and where convulsions are combined with the pain, those convulsions are also produced by striking the spine.

In the more severe cases of spinal irritation, which closely border on acute spinal meningitis, pressure on the spine causes both acute pain and violent convulsive or tetanic movements, and the slightest pressure on the site of the reflected pain will also cause convulsions. Pressure or percussion upon other parts of the skin, or on the spine above the affected portion of the spinal cord, are unattended either by pain or convulsions.—(G.)

TREATMENT.—*Indications.*—I. To subdue the tenderness of the spine. II. To remove the cause of it. III. To relieve the muscular pains.

I. The first indication is fulfilled by the application of leeches or cupping glasses to the tender part of the back, followed by blisters or the antimonial ointment; and, in less severe cases, the antimonial ointment alone.

II. The second indication requires aperients and alteratives, and remedies adapted to the particular disease or disorder of the bowels or uterus.

III. The third indication is fulfilled by hot fomentations, or by the emplastrum saponis c. opio, or the emplastrum belladonnæ, applied to the part affected.

In most cases where there is simple spinal irritation, without deformity, a cure will be effected by local depletion, counter-irritation, a course of aperient medicines, and attention to the general health.

HYDRORACHIS—SPINA BIFIDA.

This disease is congenital, and consists in one or more tumors on the lumbar, dorsal, or cervical vertebræ, which communicate with the medulla spinalis. The tumor varies in size, is often transparent, and the color of the skin may be natural, reddish, or livid. If pressure be made on the tumor, it induces signs of compression of the brain. The limbs are imperfectly developed, and the rectum and bladder are often paralyzed. The skin may be absent, and in this case the tumor is covered by the dura mater, pia mater, and arachnoid membrane; and the pia mater is congested and red.

In some cases, the lateral arches of the corresponding vertebræ are separated or wanting. The cavity of the arachnoid contains a fluid, which may be serous, transparent, sanguinolent, or purulent; may communicate with the brain; or be merely inclosed in the pia mater. In other cases, there is a division of the medulla, or it is entirely absent where the tumor is situated.

TREATMENT.—Moderate pressure has been employed to excite the absorbents to remove the effused fluid; but this is scarcely ever affected. Sir Astley Cooper used a small truss

for the purpose. When this failed, he punctured the tumor repeatedly with a fine needle, and again applied pressure. Subsequent experience has proved that both plans are ineffectual, and that the disease does not admit of cure.

SPINAL EFFUSIONS.

Serous effusions occur within the spinal canal as well as in the skull, and may be situated external to the dura mater, or within it, or beneath the arachnoid membrane, which invests the medullary cord.

Extravasation of blood may occupy the same situations, and is induced by falls, blows, slips, or other injuries of the spine, or by violent efforts, as pulling on one's boots, drawing a cork, or raising a heavy load. It is also a fact that effusions of blood have been found in cases in which no accident had occurred, the symptoms being pain in the back, spasmodic contractions of the muscles, paralysis of the bladder, rectum, and lower extremities, convulsions, or coma, and death.

The membranes of the spinal cord may be thickened and indurated, like those of the brain, and from the same causes. In some cases there are fungous growths on the dura mater, which produce pressure and paralysis.

In fine, the substance of the spinal cord may become firmer than natural after congestion or inflammation.

The treatment in all these cases is the same as for myelitis : issues, setons, antimonial ointment, and other counter-irritants, aperients, rest, &c.

The spinal marrow is liable, like the brain, to concussion and compression, induced by external injuries, whether inflicted on the back, or by falls on other parts of the body. The treatment is similar to that employed in the same diseases of the brain.

DISORDERS OF THE NERVES OF SENSATION.

NEURALGIA Nervous Pain.

ANÆSTHESIA Loss of Sensation.

NEURALGIA—NERVOUS PAIN.

Pain is not only a symptom of almost all acute diseases, but also a distinct affection of the nerves themselves. To this latter the term neuralgia is applied. It may have its seat in any of the nerves of common sensation, and, in some instances, affects those of organic life.

Neuralgia may arise from many causes ; sometimes no cause can be discovered either during life or after death, in

which case the disease is attributed to a change in the condition of the nerve itself : such are some cases of *tic-douloureux*. In other instances it is the consequence of a debilitated state of system, and follows prolonged lactation, long-continued and excessive discharges, or exhaustion from loss of blood. It also occurs in *anæmia*. In another class of cases it is confined to one side of the head and face, and assumes an intermittent character, and may often be traced to the same cause as *ague*. In many instances pain is due to some remote irritation, and is termed *sympathetic*. Examples of *sympathetic neuralgia* are the pain in the shoulder so common in affections of the liver, and pains in the upper arm in certain cases of diseased heart. Here there is a well-known connection between the nerves supplying the diseased organ and those going to the seat of pain. In other instances of *sympathetic neuralgia*, no such connection exists. Thus, common *tic-douloureux* has been distinctly traced to acidity of the stomach, or an overloaded state of the intestines ; and in one case, with which the editor is but too familiar, it has an obvious connection with diseased kidney. Another class of cases may be traced to pressure or irritation at the root of the nerves supplying the seat of pain. A *spicula* of bone, or a fragment of a foreign body, irritating the nervous trunk, is a common cause of severe and inveterate forms of *neuralgia*. Examples of the same form of disease are, pain in the *glans penis* from stone in the bladder, pain of the thigh and testicle from irritation of the kidney, pain in the back of the thigh and leg from constipation, and pain at the verge of the anus from the same cause. Distention of the hollow viscera by gas, as in *colica pictorum*, and in severe flatulence, are other examples of *neuralgia* from pressure. Another interesting and important class of pains are, *reflected* pains, generally situated in the parietes of the chest or abdomen, and very frequently in the left side. They are treated of under the head of *Spinal Irritation* (see p. 298). Pains of the internal viscera, without symptoms of inflammation, form another class of *neuralgic* affections. *Gastrodynia*, *enterodynia*, *hysteralgia*, are examples of pain in the organic nerves of the stomach, intestines, and uterus. Inflammation of the *neurilemma* is another cause of *neuralgia*, and combines heightened sensibility with pressure.

NEURALGIA FACIEI—TIC-DOULOUREUX.

SYMPTOMS.—The disease generally occurs in middle-aged adults, and affects both sexes, consisting in most acute pain coming on at variable intervals, suffering considerable abatement, or entirely disappearing, without assignable cause, for days, weeks, months, or even years together. The pain is at

first confined to a limited spot, its most frequent seat being the right infra-orbital nerve. It is of the acute lancinating kind, compared to electric shocks, or it is a severe burning sensation. Sometimes the pain is the only symptom, but more generally there is some determination of blood to the affected part, with an increase of secretion. If the eye is affected, there is a large secretion of tears; if the mouth and jaw, a copious flow of saliva. After it has continued some time, it is apt to involve other branches of the nerve first affected. Thus, if it begin beneath the orbit, it spreads to the upper lip, thence to the upper and lower jaw, and at length it may mount over the orbit, extend over the entire scalp, and even for a considerable distance down the spine. The general health is very little affected; the patient, in spite of the most intense suffering, recovers his flesh and healthy aspect in a few days of intermission, and often attains a very advanced age. This form of neuralgia is sometimes functional and disappears entirely, or it may depend on irritation of the root of the nerve within the cranium, or even on remote organic disease. In more than one case, it seems to have had an evident connection with diseased kidney.

DIAGNOSIS.—From *hemicrania*, by its more limited extent, by the absence of the intermittent character, and by its less defined boundary. From brow *ague*, by its position, which is generally beneath the eye, and by not being distinctly intermittent.

PROGNOSIS.—Generally *unfavorable*, but more so when it is of long continuance, and when the general health is unimpaired. The presence of functional disease, or of a state of health admitting of improvement by medical treatment, is ground for a *more favorable* prognosis.

TREATMENT.—This depends upon the cause. If there be pressure, it must be removed, if possible; if irritation at the root of the nerve, depletion or counter-irritants as near as possible to the seat of the disease; if there be inflammation of the nerve itself, antiphlogistic measures; if debility, tonics and stimulants, according to the degree of it; if *anæmia*, steel; if indigestion or constipation, medicines appropriate to those disorders; but if the health be good, care should be taken not to impair it, for debility always increases the suffering, and so does increased determination of blood to the part affected. If the jaw be the seat of the suffering, the patient should not be salivated; if blisters are applied, it should be at some part remote from the seat of the disease.

REMEDIES.—The *constitutional* remedies in common use are, narcotics and tonics in combination; a favorite medicine consists of quinine in two or three grain doses, with equal quan-

titles of extract of conium, or with half a grain, cautiously increased to two grains, of extract of stramonium. The carbonate of iron and the sulphate of zinc have also been given in full doses. Arsenic has been tried; narcotics, too, have been used; strychnia has been given, and creasote; and, indeed, every active remedy in the pharmacopœia. Patients have appeared to be benefited by all of them. Change of air and scene, and the use of mineral waters, have seemed to effect a cure. Croton oil, in combination with the compound extract of colocynth and the compound galbanum pill, has been recommended by Sir Charles Bell. One or two drops of the oil with a drachm of the extract, well mixed, and divided into five-grain pills, of which one is given every night with ten grains of the compound galbanum pill. Among *local* applications, extract of belladonna and veratria ointment (one grain of aconitine to one drachm of cerate) are the most effectual. A small portion of this ointment should be smeared over the track of the nerve every day, or twice daily. An ointment containing two scruples of iodide of mercury to the ounce has also been recommended. A remedy strongly recommended by Dr. Watson in an affection of the nerves of the lower jaw allied to neuralgia, is muriate of ammonia in half-drachm doses three times a day.

In a case of tic-douloureux of many years' standing, which had spread from the infra-orbital nerve to the upper and lower jaw, over the scalp and down the spine, accompanied by the most excruciating suffering, after tonics and narcotics, bleeding, blistering, and salivation, had been tried in vain, and nothing afforded any relief, a stream of cold water poured upon the head and allowed to trickle over the face and neck, procured refreshing sleep after the lapse of about five minutes, had the same effect on a repetition, and was followed by the first good night the patient had had for weeks.—(G.)

The rational treatment in idiopathic cases appears to be this. Weaken the patient as little as possible, avoid producing inflammation of the part affected, and combat the more severe paroxysms by a stream of cold water poured over the part, or by the application of ice. In cases of sympathetic neuralgia, attend to the general health, and remove all exciting causes of direct or remote irritation.

Other neuralgic affections, such as sciatica, when not merely a form of rheumatism, are to be treated on the same general principles, and by the same remedies as tic-douloureux. The indications for the treatment of all neuralgic affections are the same, whatever may be their seat.

ANÆSTHESIA—LOSS OF SENSATION.

VARIETIES.—*Anæsthesia*, paralysis of the nerves of sensation; *amaurosis*, of the retina; *cophosis*, of the auditory nerve; *anosmia*, of the olfactory; *ageusia*, of the nerves of taste.

Anæsthesia, or loss of common sensation, may occur separately or combined with paralysis of the voluntary muscles; it may be universal or partial, confined to one side or extending to both, and it may affect any part of the body. Facial anæsthesia is a well-known form of this disease.

The TREATMENT must depend entirely on the pathological condition by which it is induced: if by pressure, the cause must be removed; if by deficient supply of blood, stimulants must be resorted to; if by cold, the circulation must be restored. In other cases the treatment will be that of the other diseased conditions with which it is associated. It rarely presents itself for treatment as a separate malady.

DISEASES AFFECTING THE NERVES OF VOLUNTARY MOTION.

PARALYSIS	Palsy.
TREMOR MERCURIALIS	Mercurial Tremors.
LEAD PALSY	Dropped Hand.
PARALYSIS AGITANS	Shaking Palsy.
EPILEPSIA	Falling Sickness.
CATALEPSIA	Catalepsy.
CHOREA	St. Vitus's Dance.
HYSTERIA	Hysterics.
TETANUS	Locked-jaw.
HYDROPHOBIA	Canine Madness.

Other convulsive and spasmodic diseases.

° PARALYSIS—PALSY.

SPECIES.—1. General paralysis; 2. Hemiplegia; 3. Paraplegia; 4. Facial paralysis.

GENERAL PARALYSIS.

Sometimes the disease is of greater extent than is implied in either of the terms hemiplegia or paraplegia, and in this case receives the name of general paralysis. The disease comes on either suddenly or gradually; if suddenly, from extensive injury or sudden effusion of blood on the cranial or cervical portions of the spinal marrow; if gradually, it begins in the toes or fingers, and thence extends over the entire body. In most cases the sensibility is unimpaired, more rare-

ly both sensation and motion are lost. The functions of the intellect generally suffer at the same time, and occasionally all the faculties of the mind are paralyzed. This form of paralysis is of rare occurrence, and requires the same treatment as less extensive affections of the same kind.

HEMIPLEGIA.

This is the most common form of paralysis, and occurs most frequently on the left side. It often occupies exactly one half of the body. In most cases it comes on suddenly, in others it precedes an apoplectic attack, in others, again, it follows it. Occasionally, like general paralysis, it makes its approaches gradually.

SYMPTOMS.—The disease may extend to the entire half of the body, or it may affect only one extremity, and it may consist in a partial or complete loss of power in the parts affected. The symptoms in a well-marked case of hemiplegia affecting one half of the body are the following: the limbs of the affected side, if raised, fall by their own weight; the face of the same side is relaxed and void of expression, and drawn to the sound side; the tongue, when protruded, is thrust toward the palsied side; the speech is either lost, or it is thick, muttering, and unintelligible. In rare instances, the mouth is drawn to the affected side, and the tongue protruded toward the sound side. The loss of power is sometimes accompanied by a loss of sensation, but in a few instances with heightened sensibility; the temperature of the affected side is generally much lower than that of the sound side, but occasionally it is raised above it. The mental faculties are sometimes unimpaired, but they generally suffer, as is shown by impaired memory, confusion of thought, loss of power of attention, change of character, irritable temper, depression of spirits. The pulse is often infrequent, but sometimes above its usual standard; the respiration also is slow, and the bowels generally inactive. If the patient does not speedily recover, the palsied limbs shrink and grow cold; if he recovers, the leg commonly first regains its power. When the disease is partial, the arm is more commonly affected than the leg. If the power of the limb is merely impaired and not lost, the arm will be raised with difficulty, and often not without the assistance of the other; the hand can not grasp firmly; the leg will be dragged after the sound limb; and, in walking, the patient will be very liable to trip.

PROGNOSIS.—*Favorable* in proportion as it is recent, partial, and incomplete, and when the patient is young; *unfavorable* when extensive, of long standing, amounting to perfect loss of power, and occurring in advanced life. When combined

with anæsthesia, a return of sensation, tingling and increased temperature, are favorable circumstances. (See Apoplexy, p. 281.)

PARAPLEGIA.

Paraplegia, or paralysis of the lower half of the body, or of both lower extremities, like other forms of paralysis, may occur either gradually or suddenly. Sometimes it is complicated with head symptoms, but more generally the symptoms are limited to the lower half of the spinal cord. Injuries to the spinal cord explain the majority of cases which occur suddenly; those of gradual occurrence are generally traceable to some chronic disease of the cord or of its membranes. Caries of the vertebrae and relaxation of the spinal ligaments are other causes. Cold, intemperance, excessive sexual intercourse, and self-abuse, may also give rise to it.

SYMPTOMS.—When paraplegia is complete, there is entire loss of sensibility and motion in the lower extremities, with paralysis of the bladder and rectum. The patient being confined to the horizontal position, the back and sacrum are apt to slough. The urine is generally highly ammoniacal, and is prone to form calculous deposits. In these cases the urine should be frequently drawn off, the bladder cleansed with warm water, great attention must be paid to cleanliness, and the patient should, if possible, be provided with a water-bed.

In less complete forms of paraplegia, there is weakness of the lower extremities, with a sensation of stiffness and heaviness, numbness, tingling, or formication, and an awkward straddling gait. These symptoms gradually increase in severity until perfect paraplegia, with paralysis of the bladder and rectum, set in. In many cases, the disease does not prove fatal till it has involved the upper extremities. In many cases of paraplegia, and especially in the more complete forms of it, the reflex functions remain entire, and irritation of the sole of the foot occasions involuntary contractions of the muscles.

PROGNOSIS.—This is favorable, but guarded in cases dependent on cold, intemperance, and sexual excesses, but highly unfavorable in cases accompanied by indications of disease of the spinal cord or brain.

TREATMENT OF PARALYSIS.

The *indications* for the treatment of the foregoing forms of paralysis are the same. They consist, I. In the use of remedies appropriate to the diseased condition on which the palsy depends; II. In the use of remedies calculated to act directly on the parts affected; and, III. In the relief of incidental symptoms.

I. For the first indication, see the several diseased conditions of the brain and spinal marrow which give rise to paralysis.

II. This indication is fulfilled by friction with the flesh-brush, or with stimulating liniments, electricity, salt-water baths, shampooing, the warm *douche*, and, when the power of the extremities has in some degree returned, exercise.

III. When the bladder and rectum are involved, the frequent use of the catheter, and the injection of the bladder with warm water, are of great importance. The patient should be kept clean, his position should be frequently changed, and if bed sores should form, he should be placed upon a water-bed.

REMEDIES.—Strychnia. In cases not dependent upon inflammation or disease of the brain or spinal cord, and where the palsy arises from the long disuse of the limbs, or from exhaustion of the nervous power, strychnia in small doses, as a twelfth or tenth of a grain, two or three times a day, cautiously increased, may be given with great advantage. Its action on the system is indicated by twitchings of the paralyzed muscles; but these, taken as indications of returning power, are exceedingly delusive, as they seem to depend on an affection of the excito-motory nerves. Tincture of cantharides, in doses of from twenty drops to half a drachm, has been given with advantage in some cases of paraplegia. It stimulates the bladder to more healthy action, and, in cases dependent on effusion into the sheath of the spinal marrow, may act favorably as a diuretic.

PARALYSIS OF THE FACE.

The motor nerves of the face being the portio dura and the third division of the fifth, and the sensitive nerves the first and second divisions of the latter nerve, it is easy to trace facial paralysis to its source. In perfect paralysis of the face, the portio dura and motor branch of the fifth suffer jointly: when the latter alone is affected, the motions of the jaw on that side are paralyzed, and in this case there is usually some loss of sensibility; and as the disease is confined to the muscles employed in mastication, there is no distortion of feature.

SYMPTOMS.—In palsy of the muscles supplied by the facial nerve, the expression of countenance is peculiar. The two sides of the face are not symmetrical; but the features are drawn to the sound side, so that the straight line passing through the eyebrows and mouth respectively would meet at an angle within a short distance of the sound side of the face. In other words, the sound side appears shorter and narrower than the paralyzed side. When the patient is desired to close the eyes, that on the paralyzed side is either partially closed or wide open, while that on the sound side is firmly closed; if the patient is desired to blow, the air issues from that side;

so also with the food when the patient swallows, and with the saliva when he spits. The power of whistling is also lost; and when the patient speaks, laughs, cries, sneezes, or coughs, the deformity is increased, the paralyzed side remaining motionless, while the sound side is thrown into still stronger contortion. The cheek on the affected side is flaccid, and swells during strong expiration. The labial consonants *b*, *p*, and *f* are imperfectly sounded.

DIAGNOSIS.—From paralysis of the third division of the fifth by the masseter and temporal muscles retaining their power.

PROGNOSIS.—*Favorable*.—When the paralysis does not extend beyond the parts supplied by the facial nerve. The disease is often cured in about three weeks or a month.

CAUSES.—Wounds and mechanical injuries; the pressure of tumors; effusion into and around the sheath of the nerve; cold.

TREATMENT.—If febrile symptoms are present, bleeding from the arm; in other cases, cupping behind the ear, followed by a blister, aperients as required, and blue pill or calomel given to affect the gums.

The remaining forms of paralysis attack particular muscles or groups of muscles, and arise from injury limited to the root or trunk of the nerves distributed to them. *Strabismus* is caused by palsy of one or more of the muscles of the eye; *ptosis* and *lagophthalmia* by palsy of those of the eyelids (in the first the eye is permanently closed, in the second open); aphonia by paralysis of the muscles of the tongue. These forms of paralysis rarely occur alone, but are commonly found in combination with more extensive palsy of the face or body.

The paralysis which occurs in the insane has some peculiarities. It appears at a variable interval after alienation; appears first in the tongue, and affects the pronunciation, thence extending to the extremities, of which the lower are commonly first affected, then the superior extremities and trunk. The progress of the disease is gradual, but terminates at length in complete paralysis. At last the functions of organic life suffer, there is palsy of the bladder and sphincter ani, of the muscles of deglutition, of the respiratory muscles, and death from asphyxia. The sensibility is little impaired. The common duration of this malady is four or five years.

TREMOR MERCURIALIS—MERCURIAL TREMORS—THE TREMBLES.

SYMPTOMS.—The paralysis usually begins in the arms, coming on, for the most part, gradually. There is a sense of weakness, with slight convulsive twitchings, followed by tremors, increasing in violence till the patient is obliged to abandon his

occupation. The trembling gradually extends to the lower extremities, and at length to the entire body. All attempts at motion bring on the trembling, which ceases when the body is at rest, or the limbs supported. The patient dances rather than walks, is unable to grasp objects, the speech is hurried and abrupt, and in extreme cases he can not even masticate his food. If the patient continues to expose himself to the poison, restlessness, sleeplessness, and delirium supervene. Salivation is sometimes present, but in the majority of cases absent. The general health is at the same time impaired, and there are nausea and anorexia, a dry skin and a furred tongue; but there is no disorder of the circulation or respiration, or of the digestion, and no colic.

DIAGNOSIS.—From paralysis agitans, by the history of the case, and the absence of trembling when the limbs are supported.

PROGNOSIS.—Generally favorable, if the patient leaves his employment.

CAUSES.—The process of water-gilding, employment in quicksilver mines. Long exposure in any way to the fumes of mercury.

TREATMENT.—A temporary cessation of employment; a combination of tonics and sedatives; preparations of iron; a generous diet, with a moderate allowance of wine; the shower-bath.

PROPHYLAXIS.—Cleanliness and free ventilation of the places of work; an arrangement by which the fumes of mercury can be carried off, such as a large funnel terminating in a tube, the tube being heated to occasion a draft.

LEAD PALSY—DROPPED HAND.

SYMPTOMS.—The hands are generally first affected, and in some cases the forearm suffers. It begins by a feeling of weakness in the fingers, extending to the wrists, and rarely beyond them. There are, at the same time, shooting pains in the forearms, arms, and shoulders. The parts affected, after a time, waste from disuse, and the hand drops useless from the wrist. The disease is generally preceded by colic, but may occur independently of it.

DIAGNOSIS.—The seat of the palsy, assisted in many cases by the blue line on the gums.

PROGNOSIS.—In many cases, recovery after a long course of treatment. The prognosis is more favorable in first attacks and slight cases.

CAUSES.—This form of paralysis attacks plumbers and glaziers, oil-painters, enamel card makers, &c.

TREATMENT.—The hand to be supported by a splint. The

internal remedies are the Bath waters, and strychnine ; the external remedies are electricity, shampooing, the warm douche, friction with the flesh-brush or with stimulating liniments.

PROPHYLAXIS.—Scrupulous cleanliness, especially before meals, sulphuric acid lemonade as a beverage, fat and oily articles of food.

Arsenic.—This poison, too, produces paralysis, which generally occurs in the extremities, and is the most frequent of its secondary effects.

PARALYSIS AGITANS—SHAKING PALSY.

SYMPTOMS.—The approach of this affection is gradual. There are weakness and trembling, usually commencing in the hands and arms, but sometimes in the head, and gradually extending over the whole body. At length the trembling becomes incessant ; and when the patient attempts to walk, “he is thrown on the toes and fore part of the feet, and impelled, unwillingly, to adopt a running pace, being in danger of falling on his face at every step.” In a still more advanced stage, the shaking continues during sleep ; the patient can not carry food to the mouth ; mastication and deglutition are performed with difficulty ; the agitation at length becomes so violent as to prevent sleep ; the body is bent forward, with the chin upon the sternum ; articulation is impaired or entirely lost ; the urine and fæces pass involuntarily, and coma and slight delirium close the scene. In some cases, the muscles of respiration are affected, and the breathing becomes extremely frequent. (In one case, occurring in a vigorous young man, 73 in a minute, with a pulse of 72.—G.)

DIAGNOSIS.—The trembling continuing even when the limbs are supported, and the peculiar gait.

PROGNOSIS.—Unfavorable in persons advanced in life. Less unfavorable when, as in rare instances, it occurs in persons in the vigor of life.

CAUSES.—*Predisposing.*—An advanced period of life.

Exciting.—Hard drinking ; previous attacks of rheumatism ; obscure disease of the spinal cord.

TREATMENT.—This must be regulated by the age of the patient and the existing state of the system. In persons advanced in life, a combination of stimulants and sedatives is indicated ; in persons previously intemperate, the treatment proper to delirium tremens. In younger persons, cupping and counter-irritants to the spine, with remedies appropriate to the state of the system. If plethora is present, depletion ; if great constitutional debility, preparations of steel, as the carbonate or sulphate of iron in full doses.

EPILEPSIA—EPILEPSY—FALLING SICKNESS.

SYMPTOMS.—Sudden loss of sense and power of motion, so that, if the patient be standing, he immediately falls, or is thrown to the ground, with convulsions, frequently preceded by a loud, piercing cry. During the fit there are strong convulsive motions of the limbs and trunk of the body, and spasms of the muscles of the face and eyes, producing various distortions of the countenance. The brows are knit; the eyes fixed and staring, or turned up beneath the lids so as to display the whites of the eyes. The hands are firmly clinched, and the arms are tossed about. The breathing becomes gasping and difficult, or is altogether suspended; the heart beats violently; the face is turgid and livid; foam, often bloody, issues from the mouth; the jaws are contracted with great force, so that the under lip, or the tongue, if protruded, is apt to be severely injured. The fæces, urine, and semen are sometimes expelled, and there is occasionally rigidity of the penis. After a longer or shorter continuance of the convulsions, they cease altogether, and leave the patient motionless, but in a state of insensibility, and under the appearance of a profound sleep. He gradually recovers, and, if left to himself, will generally sleep for some hours.

The fit in this, its strongly-marked form, generally lasts from five to ten minutes, but sometimes is of much shorter duration. Sometimes there is a succession of fits, with intervals of torpor, lasting for several hours.

There is a form of epilepsy, of frequent occurrence, called by the French the *petit mal*, in contra-distinction to the foregoing, which is designated the *grand mal*. It consists in sudden and transient giddiness, with loss of consciousness, confusion of mind, unsteadiness of gait, accompanied in some instances by slight convulsions.

Premonitory Symptoms.—The fit is frequently ushered in by premonitory symptoms, such as pain in the head; lassitude; disturbance of the senses, consisting in a bright circle of colors before the eyes, or a sudden light, or *muscæ volitantes*, and sometimes spectral delusions; or there is a loud noise in the ears, or an offensive smell, or a bitter taste; unquiet sleep; unusual dread; palpitation of the heart; coldness of the joints; fluttering at the epigastrium; vomiting; a sensation of cold; the *aura epileptica*, or pain, arising in some part of the extremities, and gradually creeping upward, until it reaches the head, when the patient is instantly deprived of his senses, and falls, as above described. In the majority of cases, the fit is not preceded by any warning. The fits occur at very variable intervals; sometimes there are several in

one day ; in other cases, there are intervals of months or years.

CAUSES.—Predisposing.—Epilepsy or insanity in parents or ancestors ; serofula ; malformation of the head ; the male sex ? debility in nervous persons ; dissipation, intemperance, self-abuse, excessive or suppressed discharges.

Exciting.—Mechanical, chemical, or mental stimuli ; especially the effects of joy and surprise ; sudden fright ; fits of passion, or any vehement emotion of the mind ; irritation ; sexual intercourse ; plethora of the vessels of the head ; worms ; dentition ; acute pain ; excessive evacuations ; suppression of accustomed discharges ; tumors compressing the brain, or any part of the nervous system.

DIAGNOSIS.—*From Hysteria*, by the total suspension of consciousness, the solitary cry, the deep sleep which succeeds the fit. *From feigned epilepsy*, by the total insensibility extending even to the retina. *From Apoplexy*, by the transient nature of the fit, the absence of the stertorous breathing, and, in most cases, of paralysis. By the motions of the voluntary muscles in the one disease being increased, in the other totally suspended.

PROGNOSIS.—Favorable.—The disease being sympathetic, occurring before the age of puberty, and arising from obvious exciting causes easy of removal. In females, being connected with some functional derangement of the uterine system.

Unfavorable.—The reverse of the above. The disease coming on after the age of puberty ; hereditary predisposition ; serofulous diathesis ; long previous continuance of the malady, and frequent occurrence of the fits ; misshapen skull ; the epileptic physiognomy ; impairment of the memory and judgment ; fatuity, or paralysis.

TREATMENT.—I. During the fit. II. During the interval.

During the Fit.—In general, little else can be done during the paroxysm than to use the necessary precautions to prevent the patient injuring himself in the violence of the convulsions, and taking care there is no pressure on the vessels of the neck. The patient should, therefore, be placed, if possible, on a soft bed, and the neckcloth and shirt-collar should be loosened. The violent convulsions may also be restrained by the by-standers. By way of precaution, and to prevent the tongue from being bitten, a piece of soft wood or a pad of linen should be placed between the teeth.

If there be decided symptoms of determination of blood to the head, or if the patient be of a full, plethoric habit, blood may be cautiously abstracted from the arm or nape of the neck. Cold may be applied to the head, and warmth to the extremities. After the fit, the patient should be allowed to

sleep ; and, if much exhausted, may take some slight stimulant.

In the Interval.—The recurrence of the paroxysm is sometimes prevented,

1. By removing all causes of irritation, as constipation, intestinal worms, the irritation of teething, &c.

2. By avoiding the occasional or exciting causes, as overdistention of the vessels of the head, however induced ; fits of passion, or other violent emotions of the mind ; intemperance, dissipation, or other bad habits.

3. If the patient be of a plethoric habit, by occasional bleeding ; abstemious diet ; issues or setons in the neck ; irritation in the course of the spine with antimonial ointment ; frequent purges, &c.

4. If weak and irritable, by tonics : as cinchona, quinine, sulphate of zinc, oxyd of zinc, sulphate and carbonate of iron, sulphate of copper, or the cuprum ammoniatum, nitrate of silver, liq. arsenicalis, combined with regular hours, early rising, regular exercise, nourishing but not stimulating diet, and cold bathing, or the shower bath.

5. If the disease occur in females, the treatment must be regulated by the state of the uterine function. If amenorrhœa with anæmia, or anæmia alone, be present, full doses of steel ; if amenorrhœa with plethora, the treatment proper to plethora ; if dysmenorrhœa, the treatment recommended for that disease ; if leucorrhœa or menorrhagia, tonics and sedatives, with astringent injections ; if the nervous symptoms attendant on the change of life, and on most debilitating diseases of the adult female (*mimosis inquieta*), the same combination of tonics and sedatives as recommended in *mimosis*.

6. If there is a syphilitic taint, mercury, or the iodide of potassium, may be given, as in other secondary cases.

REMEDIES—*Immediately before or during the Fit.*—Pressure on the carotids ; a ligature between the part from which the aura first proceeds and the brain, as round the thumb or little finger when it begins there ; a strong mental effort ; violent exercise ; violent irritation of the nostrils with snuff, or strong smelling salts ; dashing cold water over the face and head ; an emetic ; a full dose of opium or laudanum. *In the Interval.*—The metallic and vegetable tonics already specified, together with wormwood, the cardamine pratensis ; the mistletoe and oak bark in doses of two drachms two or three times a day ; gratiola ; mugwort ; narcotics and sedatives, as opium, lactuca, conium, stramonium, belladonna, and digitalis ; antispasmodics, as valerian, asafoetida, musk, and castor ; nuxvomica and strychnine ? turpentine, recommended on high authority, and indicated wherever worms are suspected to ex-

ist; electric sparks drawn from the head? oxygen gas? In cases preceded by the aura, division of the nerve running from the seat of the aura or amputation of the part? carbonate of potash?

Where no obvious cause of irritation, and no marked deviation from the usual state of health can be found, the treatment is, and must be, purely empirical. The balance of authority is in favor of tonics, of which the sulphate of zinc, in doses increased from two or three grains up to a scruple or half a drachm, three times a day, is the best. It may be given in combination with sulphate of magnesia in doses sufficient to insure the free evacuation of the bowels. In confirmed cases, all remedies are useless.

The most important point of the treatment is to ascertain the exciting causes, and to remove or avoid them. In the absence of an obvious exciting cause, a treatment adapted to the existing state of health; and when this is good, any of the metallic tonics with gentle aperients.

CATALEPSIA—CATALEPSY.

SYMPTOMS.—Catalepsy is an extremely rare disease, allied to those of the present section. Its essential features are, a fixing of the body in the position in which it happens to be at the moment of the seizure, or in which it may be placed during the fit, accompanied by total insensibility. The fit itself is rarely, if ever, fatal; but the intellectual faculties seem to suffer by its frequent repetition.

A lad of about fourteen years of age, a playmate of my own, was subject from childhood to this disease. He was often seized in the midst of his sports, at irregular intervals, and without any previous warning, and fixed like a statue in the attitude in which he happened to be at the moment; the fit rarely lasted more than one or two minutes, and when it ceased, he resumed the sport in which he had been engaged with a slight air of surprise and embarrassment.—(G.)

The *causes* of this disease are obscure, and little is known of its appropriate treatment. The general principles on which it should be conducted are the same as those of epilepsy. Existing irritation must be removed, and any occasional determination of blood to the head must be met by appropriate remedies.

CHOREA SANCTI VITI—ST. VITUS'S DANCE.

SYMPTOMS.—The disease generally sets in with slight convulsive movements of the face or one of the limbs, which gradually extend and increase in severity till they embrace one side of the body or the whole frame. The lower extrem-

ity is mostly first affected ; there is a kind of weakness and lameness in one of the legs ; and, though the limb be at rest, the foot is often agitated by involuntary motions, turning it alternately outward and inward. In walking, the affected leg is seldom lifted as usual, but is dragged along, as if the whole limb were paralytic ; and when it is attempted to be lifted, that motion is unsteadily performed, the limb becoming irregularly and ludicrously agitated. The arm, too, is abruptly drawn convulsively in a direction contrary to that intended, so that in attempting to raise any thing to the mouth, the patient often jerks it over his head. If the arm is held out, the fingers can not be kept steady ; the eyes and countenance are strangely distorted, and the convulsive movements are generally accompanied or followed by a vacant expression of countenance. The muscles are usually quiet during sleep, but there are exceptions to this rule. The health of patients affected with chorea is generally but slightly impaired, with the exception of the digestive organs. Constipation is an almost constant accompaniment, and there is sometimes loss of appetite, a foul tongue, and offensive breath. In females, the uterine functions are sometimes disordered.

RATIONALE.—A disorder of the reflex function, irritation of the bowels or uterus being communicated to the spine and reflected as convulsions on the voluntary muscles, the strange distortions of the disease being due to the conjoint action of the will and the excito-motory system? In rare instances the disorder originates in the spinal cord itself.

CAUSES.—*Predisposing.*—General weakness and irritability of the nervous system ; youth (from 7 to 15 years of age) ; female sex. It may occur in adults of both sexes to the age of seventy. *Exciting.*—Intestinal irritation from constipation or worms ; uterine irritation ; affections of the mind, fright, horror, anger.

DIAGNOSIS.—From hysteria, by the grotesque movements, and the absence of convulsive affections of the respiratory system.

PROGNOSIS.—Favorable in the great majority of cases.

TREATMENT.—*Indications.*—I. To remove causes of irritation. II. To improve the general health.

I. By far the most common cause of irritation is in the bowels, and purgatives, judiciously and perseveringly administered, are the chief remedies ; in most cases, perhaps, the only efficient ones. A powder or pill consisting of equal parts of hyd. c. cretâ and pulv. rhei (the dose varying with the age) may be given every night, and a dessert or table spoonful of castor-oil, or other simple aperient, every morning. More active purgatives may be substituted, if necessary. The bow-

els should be kept open once, twice, or thrice daily, but hypercatharsis should be very carefully avoided. The evacuations should be inspected daily, and the purgative plan should be persevered in till the discharges assume a healthy appearance. In many cases nothing more will be required.

If the source of irritation should be found in the uterus, remedies appropriate to the existing disorder of that organ must be given. If there is tenderness of the spine, the case should be treated as one of spinal irritation.

II. The general health may be improved by tonics, of which the metallic tonics are the best, such as the sulphate of zinc and the sulphate or carbonate of iron, in full doses; cold bathing and the shower bath, nourishing diet, fresh air, and regular exercise, may be prescribed with great advantage. These remedies may be used in combination with a course of aperient medicines; but, whatever else is done, purgatives should never be omitted.

REMEDIES.—Tonics: among metals, sulphate and carbonate of iron, sulphate of zinc, and arsenic: among vegetables, bark, quinine, and strychnia! narcotics and antispasmodics; turpentine; cod-liver oil; electricity?

[It will often be necessary to have recourse to tonics to invigorate the body, and thereby diminish the nervous susceptibility, where the condition of the mucous membrane does not contra-indicate their use. The metallic tonics especially have been the most extensively used, and found more successful than those of the vegetable kingdom. Among the remedies of this nature, the subcarbonate of iron has been the most successful. Zinc in the form of oxyd and sulphate has also been used. The hydro-ferro-cyanuret of zinc in the dose of one or two grains, two or three times a day, has been eminently successful. The patient should use regular exercise daily in the open air in connection with the tonic course just mentioned, in a dry and cool section of the country.]

HYSTERIA—HYSTERICIS.

SYMPTOMS.—The disorder occurs by paroxysms or fits, generally preceded by yawning, stretching, dejection of spirits, shedding of tears, alternate flushings and paleness, difficulty of breathing, sickness at the stomach, and palpitation of the heart; there is often an acute pain in the left side, about the flexure of the colon, with sense of distention, giving the idea of a ball or globe rolling itself about in the abdomen, and gradually advancing upward until it gets into the stomach, whence, rising to the throat, it occasions, by its pressure, the sensation of an extraneous body lodged there, and called *globus hystericus*. The fit having arrived at its height, the patient appears

threatened with suffocation; the face is flushed, the nostrils distended, the abdomen is protruded and tympanitic, the head is thrown forcibly back, and the limbs are strongly convulsed. The patient bursts into violent fits of laughter, sobbing, or screaming, utters incoherent expressions, and is in a state of temporary delirium. The spasms at length abating, a quantity of gas is evacuated upward, with frequent sighing and sobbing; a large quantity of limpid urine is discharged; and the patient recovers the exercise of sense and motion, without retaining any distinct recollection of what has taken place; feeling, however, a severe pain in her head, and a soreness over her whole body.

The fit sometimes appears in a less marked form, consisting of sudden insensibility, laborious breathing, swollen neck, flushed cheeks, and a closed and trembling eyelid; and the patient recovers crying and sobbing.

CAUSES.—*Predisposing*.—Female sex; celibacy; the age from puberty to the fifty-fifth year; rare in the male sex, but liable to occur under mingled debility and excitement; studious and sedentary life; grief; anxiety of mind; delicate health.

Exciting.—Constipation; dyspepsia; flatulence; excessive evacuations; suppression of the menses or lochia; plethora; violent emotions of the mind; imitation or sympathy; tight lacing, or other impediments to the breathing.

Proximate.—Spinal irritation! A tender state of spine is a common accompaniment of hysteria.

DIAGNOSIS.—*From Epilepsy*, by the convulsive motions being subject to control by a strong effort of attention, while in epilepsy they are altogether involuntary; by the insensibility not being complete; by the absence of distortion of the features, and by the peculiar trembling of the eyelid. This latter sign is of great value, for wherever it is present, whatever the name given to the disorder, whether hysteria, catalepsy, trance, or mesmeric slumber, it is a sign of safety, and strongly suggestive of cold affusion. In hysteria the respiration is sighing and sobbing, and often mixed with cries or laughter. In epilepsy the respiration is suspended, or there are ineffectual efforts at expiration. *From Mimosis Inquieta*, by the absence of fits; but hysteria is often superadded to the group of symptoms which bear that name.

PROGNOSIS.—Hysteria is very seldom attended with danger. In males affected with hysteria there is some ground to apprehend future mental unsoundness.

TREATMENT.—I. During the fit. II. During the intermissions.

During the Fit.—In general, nothing more is necessary than to dash cold water repeatedly into the face; to rouse the pa-

tient by speaking to her in a loud tone of voice ; to unloose the stays if they are tight, and to apply ammonia to the nostrils. Medicines are as unnecessary as they are useless. Those usually given are asafœtida, fetid spirits of ammonia, æther, valerian, castor, opium, and all the so-called antispasmodics.

The persevering use of cold water as a shock not only serves to remove the existing attack, but often effects a cure after antispasmodics have been used in vain. In a young man who had had repeated attacks of hysteria in a marked form, and who had taken the strongest and most nauseous remedies for several weeks without effect, this simple means speedily effected a cure. He has since become the victim of hopeless melancholia. I have seen a prompt and a permanent cure follow the disuse of tight lacing.—(G.)

During the Intermissions.—The treatment will depend upon the existing state of the system, and the condition of the alimentary canal. The bowels must be kept free, without being irritated by violent purgatives. If there is extreme debility, stimulants will be required ; if a less degree, tonics, of which the metallic tonics are the best ; if plethora be present, a regulated diet ; and in extreme cases, the abstraction of blood ; if anæmia, steel ; if the symptoms of *mimosis inquieta*, a combination of tonics and sedatives. (See *Mimosis*.) If there is spinal tenderness, blisters or tartar-emetic ointment to the spine. Disorders of the uterine functions require the remedies proper to the particular disorder present. Change of scene, cheerful society, regular exercise, and the shower bath, may be prescribed with advantage. The diseases or states of system with which hysterical fits are most commonly combined are, plethora, anæmia, chlorosis, and *mimosis inquieta*. (See those diseases.) As far as the mind is concerned, hysteria is most common in the perverse and irritable, and in persons of both sexes who possess little self-control. The education of young girls in the present day is admirably calculated to promote hysteria, combining an excessive mental with a defective physical education, causing excitement of mind with bodily debility, a combination always capable, without local disease, of producing hysteria.

In the foregoing description, the term hysteria has been restricted to a disorder accompanied by fits ; but it is usual to give to this term a much more extended meaning, and to designate as hysterical all the more obscure diseases of females. This indiscriminate usage of the term often leads to obscure and unsatisfactory views of the real condition with which we have to do. Thus, extreme tenderness of the skin of the abdomen, or neuralgic pain of the muscles, often confounded by

careless observers with peritonitis, is designated as hysterical; so, also, with pleurodyne, which is apt to be mistaken for pleuritis. There are other affections, however, which may still, without impropriety, be designated as hysterical, such as aphonia, dysphagia, dry cough, dyspnœa, hiccough, flatulence, paralysis, syncope, brow ague, irritable breast, besides a large class of anomalous nervous affections, which often closely simulate diseases of a more severe and formidable character. The mind of hysterical females is, doubtless, often in a state bordering on insanity; an intense desire for sympathy being the mainspring which sets the strange machinery in motion. The mind, in fact, is in the same state as the body; and as the convulsive movements are partly due to an excited state of the reflex function, and partly to an absence of self-control, so the extraordinary mental condition is the effect of the extension of the same condition of the nerves to the brain, accompanied by the same absence of self-control.

Hysteria is very rare in strong-minded females; and of three cases which have come under my notice in the other sex, two have occurred in men remarkable for their want of self-control, one of whom is now insane; and the third was a single attack occurring in a medical student, on the evening of his obtaining a prize for which he had long been anxiously striving.—(G.)

We shall often be greatly assisted in determining the true nature of these anomalous diseases by observing one or other of the following circumstances: 1. That the patient, seeming to labor under a disease which is usually accompanied by emaciation and a decided appearance of ill health, loses neither flesh nor color; so that if she have long been confined to bed with paralysis, her limbs remain plump and firm; if she has not been able to swallow for weeks, or is troubled with incessant vomiting, she seems to have taken at least three meals a day; if she has been a martyr to excruciating pain, her face is as free from wrinkles as if she never had a care or a pang. 2. That though, in some anomalous cases, the patient seems to be altogether insensible, the pulse beats as usual, the face has its natural color, and while all other parts are motionless, the eyelids vibrate rapidly, and especially when any effort is made to rouse her. 3. That a great proportion of these affections are associated more or less with disorders of the respiratory function. 4. That the patient is, or has been, subject to flatulence, borborygma, globus hystericus, or well-marked hysterical fits. In the treatment of these disorders, it is necessary that the medical man should combine great firmness with kindness, and that he should not spare cold water. Cold affusion is the only remedy which can be relied on, and is worth a whole pharmacopœia of antispasmodics.—(G.)

TETANUS—RIGID SPASM—LOCKED-JAW

SYMPTOMS.—Sense of stiffness in the back part of the neck, rendering the motion of the head difficult and painful ; difficulty in swallowing ; pain, often violent, referred to the sternum, and thence shooting to the back ; spasm of the muscles of the neck, pulling the head strongly backward ; rigidity of the lower jaw, which increasing, the teeth become so closely set together as not to admit of the smallest opening, when the affection is called *trismus*, or *locked-jaw*.

If the disease proceed further, it soon involves the muscles of the trunk and spine, so that the whole body is bent forcibly backward (*opisthotonos*), or forward (*emprosthotonos*), or to the side (*pleurothotonos*).

At length every organ of voluntary motion partakes of the disease ; the extremities are rigidly extended ; the abdominal muscles strongly retracted ; the eyes fixed ; the forehead drawn up into furrows ; the jaws strongly closed ; and the whole countenance exhibits the most shocking distortion. These violent contractions occasion the most excruciating pain. The pulse is accelerated, the respiration suspended or laborious, the heat of the surface greatly increased, and the skin covered with a profuse perspiration. A partial remission of the symptoms occasionally takes place every ten or fifteen minutes, but they are renewed, with aggravated torture, from the slightest causes, even the least motion of the patient, or the touch of an attendant. If the patient fall asleep, the muscles relax.

In fatal cases the symptoms rapidly increase in severity ; there is urgent dyspnoea, with an agonizing sense of suffocation ; a cold clammy sweat ; a small and imperceptible pulse ; froth or bloody mucus at the mouth ; the countenance becomes livid ; delirium sometimes supervenes, and the patient dies exhausted, or suffocated by the rigid spasm of the muscles of respiration.

The *duration* of the disease varies. One case of acute tetanus is on record which proved fatal in a quarter of an hour ; the common duration of fatal cases is from four to eight days. In cases of recovery, the duration varies from a week to two or three months.

Latent Period.—From a few minutes to ten weeks. Most common period, from the fourth to the fourteenth day.

CAUSES—Predisposing.—The male sex ; robust and vigorous constitution ; warm climates ; the period of infancy.

Exciting.—Vicissitudes of temperature ; exposure to cold, united with moisture ; or to excessive heat ; great fatigue ; wounds, especially punctured wounds of the extremities ; in-

juries of nerves or tendons by puncture or laceration ; the presence of irritating substances in the stomach or alimentary canal (the common cause of the *tetanus neonatorum*) ; cessation of habitual discharges ; irritation of the extremities of the nerves ; affections of the mind ; strychnia, and the plants of which it is the active principle.

ANATOMICAL CHARACTERS.—Not constant. In some cases there are signs of inflammation in the spinal cord and its membranes (centric tetanus) ; but in many instances those parts are perfectly healthy, the disease being due to some remote irritation conveyed to the spinal marrow, and reflected on the muscles (eccentric tetanus). Traces of injury to the nerves in cases of traumatic tetanus. The muscles often ruptured and gorged with blood.

PROGNOSIS.—Extremely unfavorable ; more so when the disease arises from wounds or injury to the nerves than when proceeding from cold ; when it comes on suddenly, and soon after the receipt of an injury, and rapidly increases in severity, than when slow in its progress ; when the spasmodic contractions quickly succeed each other, and are excited by very slight causes, than when there is a considerable interval. Survival beyond the fourth day is a favorable circumstance.

TREATMENT.—I. Of traumatic tetanus. II. Of idiopathic tetanus.

In *traumatic tetanus*, the nerve supplying the injured part should be divided as early as possible in the disease. The rest of the treatment is that of idiopathic tetanus.

In *idiopathic tetanus*, the treatment which is most justified by experience is that by active purgatives ; and of these, turpentine is the best ; an ounce of the spirits of turpentine with an equal quantity of castor oil, and, if this should not act freely, one or two drops of croton oil in addition, may be given at short intervals, till the bowels are freely moved. Glysters may also be administered, but as when given in the ordinary way they often fail, Dr. O'Beirne's rectum tube may be employed. Purgatives and other medicines given by the mouth should be introduced by means of a flexible tube passed through the nostril, or behind the last molar tooth.

If there is tenderness in the spine, a blister may be applied to the whole length of it, or a bladder of ice.

The rest of the treatment will consist in giving wine and nourishment at short intervals, and keeping the patient as quiet as possible.

REMEDIES.—Narcotics and sedatives, as opium, morphia, hydrocyanic acid, digitalis, stramonium, tobacco, belladonna, hyoscyamus, conium, musk, camphor ; all of which have been given in enormous doses, with very doubtful advantage. The

Indian hemp recently introduced to the notice of the profession by Dr. O'Shaughnessy is the best of this class. It is given in doses of two or three grains every second or third hour. In ten out of twelve cases of *traumatic tetanus* treated by himself or others, a cure was effected.—(See Brit. and For. Med. Rev., July, 1840, p. 225.)

Mercury has been administered in large doses, so as to produce salivation, but it has only served to increase the sufferings of the patient.

Depressants, as bleeding, tartar-emetic, tobacco enemata, and the warm and vapor baths. Tonics, as quinine, carbonate of iron, and sulphate of zinc; and stimulants, as wine, brandy, and ammonia. The cold affusion, a remedy which must be used with **great caution**.

The best mode of applying cold is to place the patient in a warm bath, or to wrap him in hot blankets, and then to pour cold water on the head, at first from a moderate height and in a stream, and, if the patient bears this well, from a greater height and in a fuller stream. The sudden shock has more than once proved fatal. The hand should be kept on the pulse during the operation, and its effect on the circulation should be carefully noted.

[There is an account of seven very interesting cases of traumatic tetanus cured by strychnine by Dr. Fell, in the number of the New York Journal of Medicine and the Collateral Sciences for November, 1846, edited by Charles A. Lee, M.D.]

HYDROPHOBIA.

SYMPTOMS.—At an uncertain time, ranging from three or four weeks to eighteen months after a bite from a mad animal, pain or uneasiness, or some unusual sensation, often accompanied by inflammation, is felt in the seat of the wound, followed, in many cases, by pains darting from it along the course of the nerves. These local symptoms are not constantly present. After a few hours or days, wandering pains are felt in different parts of the body, the patient complains of stiffness of the neck and throat, and is restless, irritable, and drowsy, his spirits are depressed, and he is observed to sigh frequently and deeply; his sleep is disturbed with frightful dreams.

The true nature of the case is first revealed by an unusual difficulty in swallowing liquids, which becomes more and more strongly marked, till it rises to such a pitch that the moment any fluid is brought near the patient, or when the noise of the fluid is heard pouring out of any vessel, it occasions him to start with great dread and horror, and the at-

tempt at deglutition is hurried, accompanied with sobbing or deep catching sighs, and followed by convulsions.

There is a degree of irritability beyond description ; the countenance expresses intense anxiety, alarm, and suspicion ; the eyebrows are contracted, the eyes wild, staring, and glassy ; there is intolerance of light and sound, urgent thirst, a parched tongue, a hot and dry skin, and painful efforts to vomit. The sufferer often screams violently, and talks in a loud, important, and authoritative tone ; spits out the viscid saliva between his closed teeth, with loud and noisy strainings, not unlike the barking of a dog. In spite of these severe sufferings, the mind often remains unaffected to the last, but in other cases the patient lapses into wild delirium, talks incessantly and incoherently, and is in a state of the most distressing restlessness ; the slightest motion, or sudden change of position, a breath of air, a ray of light, a polished surface, or the slightest noise, will excite a sensation of suffocation and convulsions ; delirium in some instances takes place, convulsions now become frequent, and the patient dies convulsed, exhausted, or asphyxiated.

Duration.—Generally from two to three days. In one case, thirty-six hours ; in rare instances, eight or nine days.

Latent Period.—From three or four weeks to some months, or even years. The most common period from twenty to forty days.

Prognosis.—Fatal. The disease has hitherto defied all remedies.

Anatomical Characters.—Not constant. Slight traces of inflammation in the spinal marrow and its membranes. Inflammation of the fauces and air passages, with increased secretion.

Rationale.—Intense excitability of the nervous system, with local inflammation of the fauces acting upon the spinal marrow through the incident nerves, and giving rise to reflex convulsions ?

TREATMENT—Indications.—I. To prevent the absorption of the poison. II. To remove the irritation of the throat. III. To diminish the excitability of the nervous system.

The first indication is fulfilled by the prompt excision of the wound, which should be allowed to bleed freely, and the subsequent application of caustic. If this can not be done at once, a ligature should, in the mean time, be applied above the wound, if it be on an extremity, and the virus should be withdrawn by suction.

The second indication has never been effectually fulfilled in any other way than by the use of ice taken internally.

The third indication may be fulfilled by powerful doses of narcotic remedies. Experience, however, proves that even

the largest doses have little or no effect in controlling the patient's sufferings. Is not the application of cold to the spine and head the best remedy? or in case the peculiar local affection have passed away, and the dread of liquids with it, the cautious and judicious application of the *douche* with the precautions recommended in the cure of tetanus? (See Tetanus.)

The plan here suggested is on the authority of a very remarkable case admitted into King's College Hospital, under Dr. Todd. The patient, a boy of seven years of age, laboring under hydrophobia in its most marked form, and refusing, with characteristic horror and impatience, every thing previously offered him, whether in a liquid or solid form; and who had taken ten drops of hydrocyanic acid, repeated at short intervals, and at length twenty drops at one dose, without apparent effect; after the most severe convulsive paroxysm which had yet seized him, was offered a fragment of rough ice. This he swallowed with avidity. Fresh pieces were constantly put into his mouth, which he seized and crunched between his teeth with remarkable eagerness, swallowing them with the greatest ease. In less than half an hour, he had taken, by a rude estimate, no less than a pound and a half of rough ice. At the same time that the ice was given internally, a bladder containing a mixture of roughly powdered ice and common salt was applied to the whole length of the spine and around the throat. Under the external and internal application of cold, all the symptoms of hydrophobia, referable to the throat and chest, with the exception of occasional hawkings, had passed away; the viscid mucus no longer flowed from the mouth, the mucous râle disappeared from the chest, and nothing remained but extreme restlessness, violent excitement, and incoherence. The patient sat up in bed with a large fragment of rough ice in each hand, talking incessantly in a loud voice, addressing a thousand incoherent questions to his mother regarding members of his family, and showing an aimless eagerness. The intense excitement continuing, and all the peculiar symptoms of hydrophobia having subsided, the cold *douche* was, in Dr. Todd's absence, applied by my directions, but the system did not rally from the shock. (See *Lancet*, January 22, 1842, for a longer report of the case.)

I am inclined to attribute more benefit to the internal than to the external use of ice in this case, but the joint administration seems to be the most rational treatment yet recommended.—(G.)

If it be thought advisable to use any narcotic at the same time with the ice, the Indian hemp, recommended by Dr. O'Shaughnessy (see Tetanus), appears to be the best. Stimulants, and external warmth to other parts of the body, should be combined with the local application of cold.

CHAPTER II.

DISEASES OF THE CIRCULATING SYSTEM.

1. Of the Heart.
2. Of the Arteries.
3. Of the Veins.

DISEASES OF THE HEART.

1. FUNCTIONAL OR NERVOUS AFFECTIONS.
2. ORGANIC DISEASES.

FUNCTIONAL OR NERVOUS AFFECTIONS.

Palpitation.
 Syncope.
 Angina Pectoris.
 Neuralgia of the Heart.

PALPITATION.

THE term *palpitation*, or *nervous palpitation* of the heart, is given to frequent, strong, and tumultuous movements of the heart, without any appreciable organic lesion. When existing in an extreme degree, they are both felt and heard by the patient, and seen by the by-stander. The palpitations are sometimes accompanied by a slight and transient bruit de soufflet, which disappears as soon as the heart becomes quiet. They are also attended by a feeling of sinking and anxiety difficult to describe, which patients refer to the region of the heart or pit of the stomach, and often designate "a sinking at the heart." In some cases there is a tendency to syncope.

CAUSES—Predisposing.—The nervous temperament; the female sex; debility.

Persons of a nervous temperament, and those of both sexes who are subject to hysteria, hypochondriasis, melancholy, epilepsy, and general nervous disorders, are very liable to palpitations.

Exciting.—Strong mental emotions, joy, grief, anger, sadness, fear, anxiety, &c.; violent exercise, whether active or passive. Debility caused by chronic diseases, or occurring during the convalescence from fevers or other acute diseases; excessive loss of blood; inordinate natural discharges; abuse of purgatives; spare or unwholesome diet; the abuse of spirituous, vinous, or fermented liquors; want of sleep; long-

continued anxiety and distress ; close confinement ; intense study ; dissipation and debauchery ; excess of venereal pleasures, and more particularly onanism, as well as excessive sexual intercourse.

The diseases most frequently accompanied by palpitation are, anæmia, hysteria, spinal irritation, and *mimosis inquieta* in females ; seminal weakness in males ; plethora and pulmonary consumption in both sexes.

Chlorotic girls are often supposed to labor under organic diseases of the heart, when there is only functional or nervous disturbance of the organ. They complain of palpitations, difficulty of breathing, and pain in the left side, and are sometimes bled, leeches, cupped, and blistered when they require an opposite treatment.

Persons who suffer from spinal irritation are also very liable to palpitation, and the pulse, in such cases, may exceed 160 in the minute. In these cases there are pains extending from the spine to the abdominal and thoracic organs, to the neck, shoulders, head, limbs, and, by nervous sympathy, to every part of the body. The respiration is difficult, or easily rendered so, on any slight exertion or mental emotion ; and the pressure of the stays on the chest, round the waist, or lower part of the spine, is intolerable. Pressure on the affected part of the spine has suddenly induced pain in the chest, cough, and palpitation. This disease is very common in large towns, in girls and young women, from the age of fifteen to twenty-five years.

Lastly, nervous palpitations are very common at the cessation of the menstrual function, and in women laboring under diseases of the womb, ovaries, breasts, or any chronic complaint. They may be slight, transient, and intermittent, like all other nervous disorders ; and they recur more frequently in proportion as the heart becomes more irritable ; but they do not produce any serious alteration of the health unless they continue for a long time, when they may be followed by hypertrophy of the heart. They are most troublesome after vivid mental emotions and muscular exertion, though they are sometimes most distressing when the body is in a state of repose, as during the first part of the night, when they often prevent sleep for several hours. They are also occasionally accompanied by a sensation of internal agitation or fluttering in the head, chest, or abdomen, and there is often a copious and frequent evacuation of urine, when the patient is hysterical. They are least troublesome when the person is in the open air and taking exercise ; a fact attested by most nervous women.

Another cause of palpitation is dyspepsia, and this is a cause also of intermittent pulse. In some patients flatulence is al-

ways followed by palpitation. But one of the most common causes of palpitation, without organic disease of the heart, is tubercular deposit in the lung. Long before any other symptom of pulmonary consumption has made its appearance, the patient will often complain of distressing palpitation; and this is so common, that palpitation, not otherwise readily accounted for, should lead to an examination of the lungs.

DIAGNOSIS.—The condition of the general health; the absence of the physical signs of organic disease; the peculiarly distinct character of the sounds of the heart; the absence of inequality and irregularity of the pulse (except in rare cases of dyspepsia); the entire freedom which is enjoyed at intervals; the great frequency of the pulse when the finger is first placed upon it, and the gradual diminution which follows as the patient's apprehension disappears. The diagnosis is, however, not free from difficulty, and may, in some cases, require repeated examination before a decision can be formed. That this difficulty is often experienced, will appear from the observation of Dr. Baillie: "There are, in truth, few phenomena which puzzle, perplex, and lead into error the inexperienced (and sometimes the experienced) practitioner so much as inordinate action of the heart. He sees, or thinks he sees, some terrible cause for this tumult in the central organ of the circulation, and frames his portentous diagnosis and prognosis accordingly. In the pride of his penetration, he renders miserable for a time the friends, and by his direful countenance damps the spirits of his patient. But ultimate recovery *not seldom* disappoints his fears, and the physician is mortified at his own success."

TREATMENT.—In plethoric individuals, general and local bleeding from the region of the heart, by leeching or cupping, followed by tartarized antimony, digitalis, or hydrocyanic acid; counter-irritation by tartarized antimony or blisters; or an anodyne plaster over the region of the heart, as one of belladonna, opium, hyoscyamus, or conium. Low diet, repose, and quietude of mind and body; a strict attention to the state of the stomach and bowels. In delicate, nervous, and chlorotic persons, tonics, chalybeates, cold or shower baths, change of air, a nourishing diet, improvement of the digestion and general health, with moderate exercise. Blood-letting is injurious, and often productive of the worst consequences.

Palpitation in weak and nervous persons of both sexes is best treated by tonics and sedatives in combination. One of the best formulæ of this kind consists of from ten to twenty drops of dilute sulphuric acid, five drops of laudanum, five or ten of tincture of digitalis, with an ounce or an ounce and a half of the infusion of quassia.

In nervous palpitations from mental emotions, tranquillity of mind is indispensable. It is useful to observe, that nervous palpitations are often aggravated by the fear of organic disease of the heart; hence, if the medical man can succeed in convincing his patient of his error, he will often succeed in effecting a cure.

Irregular and intermittent pulsations of the heart often arise from the causes which produce nervous palpitations, and will be relieved by the same remedies. They may also depend on organic diseases of the heart. It is worthy of notice, that the pulse at the wrist and heart may be irregular or intermittent during health, become regular during acute disease, and return to its former condition during convalescence or recovery. Irregular and intermittent pulse is often traceable to dyspepsia, and to attacks of flatulence.

Pulsation in the epigastrium, like palpitation, is dependent upon various causes, and, like it, occurs in paroxysms, and in dyspeptic persons. Sometimes the pulsation is communicated to an intestine distended with gas or fæces, and in this case it is apt to simulate aneurism. It is frequently removed by a brisk purgative, or by a course of aperient medicines.

SYNCOPE—FAINTING.

SYMPTOMS.—A person about to be attacked with syncope experiences an indescribable distress, or feeling of faintness; the eyes become dim, and covered with a kind of film; there is a sense of singing or buzzing in the ears, the countenance and lips are pale, the mind fails, the body is covered with a cold perspiration, and the patient, if unsupported, falls to the ground. Sometimes the loss of sense is incomplete, when the patient turns cold and pale, yet the pulse continues to beat, or rather to tremble, and respiration is just perceptible; at others, not the smallest signs of life can be perceived; the face has a death-like paleness, the extremities are cold, the eyes shut, the mouth sometimes shut and sometimes open, the limbs flaccid, and the strength quite gone. A recovery is announced by deep and heavy sighs, and is frequently accompanied with vomiting. It sometimes terminates in epilepsy and convulsions.

DIAGNOSIS.—Syncope does not continue, in general, longer than a few seconds; but in some cases it persists for several minutes. In hysterical syncope the pulse beats as usual, the countenance is less pale, and the eyelids vibrate.

CAUSES—Predisposing.—Nervous irritability and delicacy of constitution; debility, however induced; profuse evacuations, especially of blood; organic diseases of the heart or large vessels; plethora.

Exciting.—Strong mental emotions, severe pain, loss of blood.

Treatment.—When syncope is purely nervous, there is seldom any danger. The recumbent position, fresh air, cold water sprinkled on the face and neck, and hartshorn, will soon restore animation. Hysterical syncope must be treated by cold affusion.

When fainting fits are produced by organic affections of the heart or neighboring viscera, the same remedies must be employed during the fit, and we must endeavor to prevent its recurrence by medicines calculated to remove or palliate the primary disease.

ANGINA PECTORIS, OR SYNCOPE ANGINOSA.

Symptoms.—During exercise, especially when walking up an ascent, against the wind, or after a full meal, a sudden and violent pain across the chest, extending down the arms as far as the insertion of the deltoid muscles, to the wrists, or fingers, accompanied with a sense of stricture, so acute as to threaten immediate destruction. The patient is instantly obliged to stand still, and the moment he does so all the symptoms vanish. After repeated attacks of the disease, it is excited by slighter causes, and the paroxysms are more violent and of longer duration. It often occurs on the patient's waking from his first sleep, and he is at times incapable of lying down. At length a fit more violent than usual puts an end to his existence.

Causes—*Predisposing*.—The male sex; advanced age. The great majority of cases occur after fifty years of age, but it may occur as early as thirty-five.

Exciting.—All causes which excite the circulation, as violent exercise, strong mental emotion, excesses of all kinds. It is often connected with flatulence, which forms a very troublesome accompaniment.

Proximate.—Organic diseases of the heart and large vessels: viz., ossification of the coronary arteries; ossification of the valves of the heart; morbid accumulation of fat; softening of the muscular structure of the heart.

Treatment—*Indications*.—I. In the paroxysm, to alleviate the distressing symptoms above described. II. In the interval, to prevent the return of the disease.

The symptoms are sometimes relieved

1. By bleeding. Dr. Parry recommends the patient to be placed in the recumbent position, and a small quantity only of blood to be drawn away.

2. By cordials, stimulants, and antispasmodics, as æther, laudanum, ammonia, brandy and water, and strong coffee.

The return of the paroxysm is to be prevented

1. By abstemious living.
2. By avoiding strong exercise and violent emotions of the mind.

3. By remedies adapted to the existing state of the general health and existing local affections.

REMEDIES.—Issues; setons; blisters to the chest; belladonna plasters to the side; nitrate of mercury; arseniate of potass; sulphate of zinc; emetics?

The treatment during the paroxysm must, however, depend upon the cause of the disease. When there is disease of the valves of the heart, the cautious abstraction of blood will often be indicated, and give great relief. If there is reason to apprehend atrophy of the heart, or softening of the muscular structure, bleeding is contra-indicated, and the stimulant plan should be preferred.

NEURALGIA OF THE HEART.

SYMPTOMS.—This disease differs from angina pectoris in consisting of a darting pain in the region of the heart, without any affection of the respiration; and, in most cases, without any alteration in the heart's beat. It is purely nervous, and probably dependent upon dyspepsia, combined with flatulence. It has been attributed in some cases, and with apparent reason, to the excessive indulgence in strong tea.

DIAGNOSIS.—From organic diseases of the heart by the absence of the stethoscopic signs of those diseases. From angina pectoris, by the little disturbance of the circulation, by the pain not being accompanied by the peculiar suffering of angina, and by the absence of the pains in the arms.

TREATMENT.—This must be regulated by the general state of the patient's health, and by the ascertained cause of the individual paroxysms. Benefit is often derived from the application of a belladonna plaster to the region of the heart. It is probable that certain cases of nervous asthma, and the less severe forms of angina pectoris, are simply neuralgic affections; and these are generally relieved by powerful sedatives and antispasmodics, as in cases of nervous palpitations.

Spasm of the Heart is described by Laennec, though considered an imaginary disorder by Bouillaud, who states that there is no positive fact to attest its existence. But there is no reason why the heart should not suffer from spasm as well as other muscular organs.

STRUCTURAL DISEASES OF THE HEART.

PERICARDITIS—Inflammation of the Pericardium.

ENDOCARDITIS—Inflammation of the Endocardium.

DISEASES OF THE VALVES OF THE HEART.

CARDITIS—Inflammation of the Substance of the Heart

HYPERTROPHY.

ATROPHY.

DILATATION.

CYANOSIS—Blue Disease.

PERICARDITIS—INFLAMMATION OF THE PERICARDIUM

SPECIES.—1. Acute ; 2. Chronic.

ACUTE PERICARDITIS.

Idiopathic pericarditis is of very rare occurrence. The disease is commonly an accompaniment of acute rheumatism.

SYMPTOMS.—After rigors, which are sometimes extremely severe, pain, more or less acute, under the left nipple and toward the inferior extremity of the sternum, occupying a part or the whole of the præcordial region, radiating toward the left axilla and arm, and sometimes extending down the left arm to the elbow or wrist. The pain may be pungent and lancinating, or dull and obscure. Some patients, indeed, do not complain of any pain, but merely of a feeling of oppression. When pain is present, it is increased ; when absent, often produced, by deep pressure in the intercostal spaces over the region of the heart, by upward pressure against the diaphragm, or by an attempt to lie on either side.

There are violent and often irregular palpitations distinguishable on placing the hand over the heart, and sometimes on inspection, while in other cases the hand does not detect them.

In addition to these symptoms, referable to the heart itself, there is more or less fever ; a frequent, full, hard, regular, and *jarring* pulse, or a small, unequal, irregular, and very rapid one ; dyspnœa, an insupportable sense of oppression, restlessness, jactitation, and an urgent want of fresh air ; the skin is often bathed in sweat, or it is very dry and hot ; the countenance is pale, sharpened, and marked with the greatest anxiety, and an expression of undefinable terror. Sometimes there are attacks of partial or general convulsions, the respiration is interrupted by sighs, sobs, and hiccoughs ; there is in some cases a slight and momentary delirium, and if the patient sleep, he awakes with fearful dreams ; in other cases there is complete insomnolence. The anxiety and agony are sometimes

so great and insupportable, that the slightest motion occasions an apprehension of sudden death. When the disease proves fatal, all the symptoms increase in severity, the breathing becomes more and more laborious, the countenance is livid, the eye glassy, the skin covered with a clammy sweat, and the patient expires amid dreadful sufferings.

Rheumatismal pericarditis is often indolent and attended with little pain, if pleurisy does not exist at the same time. In this last complication there is pain, more especially when the left pleura is affected; and this is never so severe and pungent as when the pleurisy is situated in the left portion of the diaphragmatic pleura.

TERMINATIONS.—1. In complete recovery? 2. In chronic pericarditis. 3. In death.

ANATOMICAL CHARACTERS.—Effusion of serum, mixed with shreds of coagulable lymph, or with pus, and sometimes tinged with blood; rough deposits of lymph on the surface of the membrane; slight and soft adhesions between the two surfaces. Within the heart, some of the appearances proper to acute endocarditis.

DIAGNOSIS.—Difficult in certain cases, and apt to be confounded with pleuritis, pneumonia, or even simple fever. When the symptoms above described are strongly marked, it is difficult to confound it with any other disease. In any case, the *physical signs* will assist materially in the diagnosis.

Percussion gives little or no assistance in acute and recent cases, unless there is extensive effusion.

Auscultation.—Within a few hours or one or two days of the commencement of the disease, a superficial *to-and-fro* sound (*bruit de frottement*), corresponding to the two sounds of the heart, and resembling the sound caused by rubbing the two hands backward and forward against each other, or when the secretion of lymph is of a more consistent character, closely resembling the sound of new leather (*bruit de cuir*), or in still more marked cases, the sound of a file or rasp (*bruit de scie*, *bruit de râpe*). As the secretion into the sac of the pericardium increases, or if the opposite surfaces become adherent, the *to-and-fro* sound disappears. This superficial *to-and-fro* sound is often accompanied by a bellows sound synchronous with the systole of the heart, and this sound often remains when the *to-and-fro* sound has ceased. The *to-and-fro* sound is first heard a little to the left of the mesial line, and about the center of the sternum, whence it gradually extends to the entire surface of the heart.

PROGNOSIS.—Complete recovery is very rare, if it ever occur. Some roughness of the pericardium, or adhesion of the opposed surfaces, or effusion into the sac of the pericardium,

is left behind, or some of the diseased states induced by the accompanying endocarditis. (See Chronic Pericarditis, Endocarditis, and Hydro-pericardium.)

CAUSES—*Predisposing*.—Hereditary tendency to rheumatic and gouty affections; male sex; age from 10 to 30. *Exciting*.—Cold, and, in the large majority of cases, the extension or metastasis of acute articular rheumatism.

TREATMENT—*Indications*.—I. To subdue the existing inflammation. II. To promote the absorption of effused matters.

I. The first indication is fulfilled by general or local bleeding, according to the strength and state of the patient. If the disease comes on suddenly in a vigorous plethoric person, blood may be taken from the arm, to the extent of making a decided impression on the pulse; and this may be followed by cupping or leeches over the region of the heart. But if the disease supervenes, as it generally does, in the course of an attack of acute rheumatism, or in one whose health is already below par, topical bleeding by cupping or leeches will suffice. In no case should depleting measures be carried to excess. This part of the treatment may be assisted by purgatives, rest, and the antiphlogistic regimen; and when depletion has been carried to the proper extent, a blister may be applied over the region of the heart, and kept open for a time by the *savin* ointment.

II. The second indication is fulfilled by mercury freely given every one, two, or three hours, in combination with opium, and accompanied by mercurial inunctions, till the gums are sore. In very acute forms of idiopathic pericarditis, the mercury may be combined with tartar-emetic, in doses of from one sixth to one fourth of a grain; and in rheumatic pericarditis, with the extract of colchicum, in doses of one, two, or three grains.

CHRONIC PERICARDITIS.

SYMPTOMS.—There is palpitation, dyspnœa, accompanied sometimes with dry cough; inability to lie on the left side; slight pain or uneasiness in the region of the heart; low fever, with or without evening exacerbation; sense of oppression; great debility; and slow and imperfect convalescence, or a fatal termination in hydro-pericardium.

Chronic pericarditis is generally a sequela of the acute form of the disease; but in debilitated constitutions, or when it comes on in the course of an attack of acute rheumatism, the symptoms are from the first much less severe, and sometimes very obscure.

TREATMENT.—Local depletion by cupping and leeches; blisters to the region of the heart; calomel and opium; or,

where the disease is the consequence of rheumatism, colchicum, combined, if there is much debility, with ammonia. The convalescence should be carefully watched, violent exercise should be avoided, and a nourishing, unstimulating diet should be prescribed.

Important structural changes often remain when the symptoms of pericarditis, whether acute or chronic, have been removed. The pericardium may be thickened, and the subjacent capillary vessels may become enlarged. There may be serum, or lymph, or pus in the pericardium; adhesions, partial or general, and organized deposits of fibrin, in the form of granulations and vegetations. The false membranes may also become fibro-cartilaginous, or osseous, and cover the heart as with an osseous shell.

The effused fluid, or the thick, false membranes sometimes compress the heart so as to occasion atrophy.

The internal sero-fibrous tissue of the heart presents the same alterations as the external covering.

The muscular tissue of the heart may, like the serous, fibrous, and cellular tissue of the same organ, become thickened and hypertrophied, indurated, or softened, or blanched, from the extension of the inflammation from the pericardium. (See Carditis.)

These changes—the effusion of coagulable lymph on the surface of the pericardium, the more dense formations just described, the adhesion of the surfaces of the pericardium, and the effusions into its sacs—may be detected by careful stethoscopic examination. The superficial *to-and-fro* sound synchronous with both sounds of the heart, already described (see Acute Pericarditis), is generally characteristic of recent effusion, and disappears as the sac of the pleura becomes distended, or when adhesions are formed. The denser deposits on the surface of the pericardium are indicated by harsher and louder sounds, corresponding to the apex or base of the heart. Partial adhesions of the two layers of the pericardium are sometimes productive of no unusual sounds; at others, of some modification of the friction sounds. Extensive adhesions of the two layers of the pericardium generally lead to irregular action of the organ, and are accompanied by a well-marked retraction of the epigastrium, and hollowing of the intercostal spaces with each systole of the heart. When the heart is thus obstructed in its movements, the beat continues to be perceptible in the same spot, in all positions of the body, and in all states of the respiration. For the physical signs of extensive effusion in the sac of the pericardium, see Hydro-pericardium.

ENDOCARDITIS—INFLAMMATION OF THE ENDOCARDIUM.

SYMPTOMS.—General feeling of uneasiness, anxiety, and oppression at the præcordia, with a tendency to syncope. No pain, unless the disease is complicated with pericarditis or pleuritis. In the more severe cases there is well-marked fever, hot and dry skin, thirst, and restlessness. There is violent and irregular action of the heart, with a *small*, feeble, and often intermitting pulse; extreme anxiety; jactitation; cold sweats; pale and shrunken features, expressive of extreme alarm; dyspnœa, faintness, or actual syncope; lividity of the lips and cheeks, slight swelling of the hands and feet, and short convulsive or epileptic seizures.

ANATOMICAL CHARACTERS.—1. Redness of the internal membrane or endocardium, sometimes extending to the entire surface, but more generally partial, often confined to the valves alone, and generally accompanied by some thickening, infiltration, and softening of the membrane.

2. Effusion of coagulable lymph, in the form of white, elastic, glutinous masses, adherent to the parietes of the heart, and entwined round the valvular tendons and fleshy columns, and often prolonged into the large vessels. They are generally adherent to the free borders of the valves, on which traces of them are found after repeated ablutions.

3. Vegetations or granulations generally situated on the free borders of the valves, and sometimes on the internal surface of the cavities, and especially of the auricles. They vary in size from that of a millet-seed to that of a grain of hemp-seed, or of a small pea; they present different shapes, according as they are single or in clusters. Sometimes they are round, at others cylindrical or flattened, and their surfaces may be smooth or rough, and when they are clustered together they often resemble the head of a cauliflower.

4. These vegetations are often accompanied by fibro-cartilaginous or calcareous indurations of the valves, and when large or numerous, they prevent the action of the valves, and more or less contract the orifices, so as to impede the circulation of the blood through the affected side of the heart, and to lay the foundations of other severe diseases of the organ. The opposite borders of the valves may adhere to each other.

CAUSES.—Those of pericarditis, with which it is often closely connected.

DIAGNOSIS.—The stethoscopic indications mentioned under diseases of the valves of the heart.

PROGNOSIS.—The disease is rarely fatal in its acute stage; but it generally leaves behind it valvular disease, which lays

the foundation of hypertrophy, and increasing impediment to the circulation, ending either in sudden death or in dropsical effusions. The duration of the disease is very various, and much influenced by the habits of the patient. It may continue for years, leading to a slowly increasing embarrassment of the circulation.

TREATMENT.—That of pericarditis. In the acute form, and in vigorous subjects, active and prompt treatment is still more necessary than in pericarditis.

When endocarditis becomes chronic without organic disease, the symptoms may be alleviated by small and repeated bleedings, cupping, or leeching; gentle aperients; counter-irritants; the warm bath; repose; and a strictly regulated diet. Issues and setons may also be used with advantage.

For further observations on the treatment of the diseases induced by or complicated with endocarditis, see the diseases themselves.

DISEASES OF THE VALVES OF THE HEART.

SYMPTOMS.—The symptoms attending on diseases of the valves of the heart are by no means uniform; but they vary with the particular valve which is the seat of the disease, and the nature, extent, and duration of the morbid change itself. This change, by the impediment which it offers to the circulation of the blood, leads to alterations in the size of the cavities, and in the strength of the parietes, of the heart; and the altered condition of the circulation through the heart itself is soon followed by serious changes in the general circulation through the body, by secondary diseases of the important viscera of the chest, head, and abdomen, and by dropsical effusions.

The symptoms of valvular disease, therefore, are partly common to all diseases of the heart, and partly peculiar to itself. The more common symptoms are palpitation, a tumultuous beat of the heart, a frequent pulse, a sense of weight, tightness, and oppression, sometimes accompanied by pain, in the region of the heart and at the epigastrium, dyspnœa, an inability to lie on one or other of the sides, and sometimes on both; flatulency, frequent feelings of faintness and giddiness, or fits of syncope; an anxious expression of the countenance, with slight knitting of the brows; the countenance sometimes pale, sometimes suffused; to which, in more advanced stages, are added cough and dropsical effusions. These symptoms are greatly increased by active exertion, walking up hill, or mounting the stairs, and by violent mental emotions, as anger, fear, fright, &c.

The effect which these alterations in the structure of the

heart produce upon the more important functions of the body deserve attentive consideration.

Influence on the Arterial and Venous Circulation.—Notwithstanding the irregular, unequal, intermittent, and violent beatings of the heart, the pulse is generally small, and often compressible, but in other cases hard and vibrating, more especially when the left ventricle is hypertrophied and contracted; and it is sometimes accompanied by a vibratory or quivering motion in the arteries near the heart.

When there is contraction of the orifices of the heart, with induration of the valves, there is a greater or less obstacle to the venous circulation. All the external veins, and those near the heart, as the jugulars, for example, are dilated, according to the degree and duration of the disease. These veins become varicose and greatly enlarged, in some cases, on the sides of the neck and above the clavicles; while, at the same time, the anastomosing veins on the parietes of the chest and abdomen, which are scarcely perceptible in the normal state, become augmented in size. The jugular veins, in such cases, sometimes pulsate synchronously with the heart and pulse; but this must not be confounded with the expansion of these veins during each expiration, or with their elevation caused by the beatings of the carotids. The venous pulse of the jugulars is the effect of the reflux of a certain quantity of blood into the right auricle and large venous trunks during the contraction of the right ventricle. This reflux occurs when the indurated tricuspid valve does not close during the systole, and when the right auriculo-ventricular orifice is so dilated that the tricuspid valve, whether normal or not, can not close hermetically at the moment of the ventricular contraction.

The lividity of the face and lips is caused by an obstacle to the return of the venous blood; and to this are also to be attributed the congestion of the hands, lungs, liver, brain, mucous, cellular, and serous membranes, serous effusions, as ascites, hydrothorax, anasarca, and also the different passive hæmorrhages. Other diseases of the organs now mentioned are often caused by obstruction to the passage of the venous blood through the right cavities of the heart. The same mechanical cause often predisposes to apoplexy and paralysis.

Influence on the Respiration.—Slight dyspnœa, or shortness of breath, increased by exertion or mental emotion, is the first derangement of the respiration; but as the disease advances, this symptom often becomes so urgent as to be incorrectly designated by the term asthma. In extreme cases, the patient can not breathe unless sitting up in bed (orthopnœa), and dreads suffocation on lying down.

Influence on the Cerebral Functions.—The countenance is

expressive of marked anxiety. The patient, though drowsy, sleeps little, and his slumbers are disturbed by frightful dreams, from which he awakes with increased difficulty of breathing, and an aggravation of all his sufferings. In fatal cases, death is often preceded by delirium, and ends in coma.

When one or more of the symptoms just detailed are present, our attention should be directed to the heart, and a careful stethoscopic examination should be made. There are also certain characters of the pulse which are alone sufficient to rouse the attention, such as an unusual frequency, accompanied by a peculiar jarring or thrilling stroke, or any inequality, irregularity, or intermission of the beats.

PHYSICAL SIGNS.—The attention having been directed to the heart as the seat of disease by any of the foregoing symptoms, the precise nature and seat of the disease may often be discovered by the use of the stethoscope. The sounds heard on the application of the instrument are the bellows sound (*bruit de soufflet*), saw sound (*bruit de scie*), and rasp sound (*bruit de râpe*). A cooing sound, and various musical sounds, are of less frequent occurrence. These sounds are generally single, accompanying either the systole or diastole of the heart, but sometimes they are double, accompanying both sounds. In the more severe and extensive diseases, the sounds are constant; when the valves have undergone less change, the sounds may be heard only during violent exertion, or in certain postures of the body.

DIAGNOSIS OF CONTRACTIONS OF THE DIFFERENT ORIFICES OF THE HEART.

Many difficulties are in the way of an exact diagnosis. The following hints may be useful :

The left side of the heart is much more frequently affected than the right.

Diseases of the right side chiefly affect the venous circulation, causing regurgitation into the jugular veins, known as the venous pulse; those of the left affect chiefly the arterial pulse, giving rise to irregularity and inequality.

The sounds produced by disease of the semilunar valves of the aorta are distinctly heard, not only over the site of the valves themselves, but also in the course of the artery, while they diminish in intensity from the base to the apex of the heart, where they become inaudible. On the other hand, the sounds produced by diseases of the auriculo-ventricular valves are heard most distinctly about an inch above the apex of the heart, and become less distinct in the track of the large vessels. The sounds have a louder and sharper tone in disease of the aortic than in that of the auricular valves.

In each valve there are two causes of abnormal sound—the direct flow of blood, and the regurgitation ; the first is synchronous with the systole of the ventricles and with the pulse ; the second, with the diastole of the ventricles.

The following are the distinctions laid down by the best authorities :

Aortic Valves.—Murmur loudest at the middle of the sternum, but distinct in the course of the large arteries ; accompanying the pulse if it depend upon the onward current, but following it if caused by regurgitation ; the sound superficial, and of a peculiar whizzing character ; the pulse *thrilling*, but often full and regular. There is sometimes a double sound, in which case the diseased valves offer an impediment to the entrance of blood into the artery, while their imperfect closure permits of reflux. The first sound, therefore, accompanies the systole, and the second the diastole of the left ventricle.

Mitral Valves.—Murmur loudest opposite the left margin of the sternum, between the third and fourth ribs ; more hollow and distant in its character ; generally accompanied by distinct purring tremor ; the sound, either single or double, synchronous either with the first or second sounds of the heart, or with both. The first sound is caused by regurgitation from the ventricle into the auricle, and is accompanied by a feeble and irregular pulse ; the second caused by an impediment to the passage of blood from the auricle to the ventricle. The sound produced by regurgitation, and accompanying the systole of the ventricle, is the one most commonly heard.

Valves of the Pulmonary Artery.—Very rarely diseased ; murmur more superficial than in the case of the aorta, but heard in nearly the same situation. Indistinct in the course of the arch of the aorta, but audible toward the left clavicle.

Tricuspid Valve.—Also very rarely diseased ; murmur most distinct a little to the right of the mesial line, and about the center of the sternum. If the disease were confined to this valve, the arterial pulse would be little, if at all, affected, while the venous pulse would be strongly marked. Generally speaking, the mitral valve is affected at the same time.

When the aortic and mitral valves are both diseased, the signs proper to both affections are combined. Diseases of the aorta itself, beyond the valves, will give rise to the same sound as disease of the valves themselves ; and if the valves, at the same time, are diseased, a double murmur will be present ; the first produced by the diseased coats of the vessel, and the second by regurgitation through the valves. The diseased coats of the aorta are accompanied by dilatation and loss of elasticity, giving rise to a peculiar thrilling pulse.

The diagnosis of the diseases of the valves of the heart may

be greatly assisted by bearing in mind the following facts: 1. These diseases are much more frequent on the left than on the right side of the heart. 2. When they occur on the right side, the left is generally affected at the same time. 3. Diseases of the right side are marked by the venous pulse, and but little change in the arterial circulation, the pulse being only so far affected as the circulation is retarded. 4. Diseases of the left side have less effect on the venous circulation, and do not occasion the venous pulse, but they have a marked effect on the arterial circulation. 5. Sounds, whether on the right or left side, which accompany or take the place of the first sound of the heart, or the systole of the ventricles, and are synchronous with the pulse, are due to the passage of the blood out of a ventricle; that is to say, to regurgitation into the corresponding auricle, or onward movement into the corresponding artery. 6. Sounds, whether on the right or left side, which accompany or take the place of the second sound of the heart, or the diastole of the ventricle, and are not synchronous with the pulse, are due to the entrance of blood into the ventricles, in consequence of the contraction of the corresponding auricles or regurgitation from the corresponding arteries. 7. Sounds which are heard at the base of the heart, and in the course of the aorta toward the right clavicle, becoming less audible toward the apex of the heart, indicate disease of the valves or coats of the aorta. If the sound accompanies the contraction of the ventricle, and is synchronous with a regular, equal, *thrilling* pulse, it is due to disease of the valves or coats of the aorta; but if the sound accompanies the diastole of the ventricle, is not synchronous with the pulse, the pulse, at the same time, being abrupt and *jerking*, and the abrupt second sound of the heart being absent or very obscure, the sound is due to reflux through the open valves of the aorta. 8. If, on the other hand, the sound is synchronous with the systole of the ventricle and with the pulse, the pulse, at the same time, being unequal and irregular, the sound is due to the reflux of the blood from the left ventricle, through a diseased mitral valve, into the left auricle; but if the sound is not synchronous with the contraction of the ventricle, it is due to the passage of the blood from the auricle to the ventricle, through a diseased mitral valve. 9. The same rules apply to the right side of the heart, which, however, is rarely the seat of disease. If the disease were in the pulmonary artery, the sound would be heard in the track of that vessel, toward the left clavicle.

The *treatment* of valvular disease of the heart will consist in the occasional and cautious abstraction of blood by a small orifice, great moderation in diet, an abstinence from all violent exertions of the body, and from strong mental emotions. In

the more advanced stages of the disease, the treatment must be determined by the existing complications. The general principle of the treatment will be to avoid all excitement of the circulation, and the use of remedies which impair the power of the heart, while any unusual embarrassment of the circulation is relieved by moderate depletion.

CARDITIS.

SYMPTOMS.—Carditis, or inflammation of the substance of the heart, rarely occurs as a distinct affection, and the post-mortem appearances which characterize its previous existence have generally been found combined with pericarditis, or endocarditis, or both. This, however, does not prove that the muscular tissue of the heart may not be separately affected, for it may be diseased, and yet not necessarily prove fatal. If articular rheumatism, affecting the fibrous tissues of the joints, may attack the fibrous tissues of the heart, there is the strongest reason, from analogy, to believe that muscular rheumatism, attacking the muscular fibre alone, or the cellular tissue by which it is enveloped, may affect the heart in common with other muscles.

Such a disease would probably be characterized by simple palpitation, with strong and abrupt contractions of the organ, a very frequent, full, and bounding pulse, and a dull, heavy sensation in the region of the heart, with paroxysms of severe darting or shooting pain in the heart itself, extending to the shoulders and down to the arms, with some degree of dyspnoea. These symptoms would accompany or follow muscular rheumatism in other parts of the body.

I have known such symptoms supervene on a severe attack of muscular rheumatism, without any indication of inflammation in the pericardium or endocardium. The treatment, in such cases, would be that of muscular rheumatism, with counter-irritation to the region of the heart, and in the most severe cases, general or local depletion.—(G.)

The existence of inflammation of the structure of the heart itself is proved by several recorded cases of softening, suppuration, ulceration, and perforation of the cardiac parietes. The symptoms, during life, are not sufficiently characteristic to admit of precise description.

HYPERTROPHY.

SPECIES.—1. Simple hypertrophy; 2. Hypertrophy with dilatation (eccentric). 3. Hypertrophy with contraction (concentric).

SYMPTOMS.—Palpitation; a strong, regular, and frequent pulse, small in hypertrophy with contraction, full in hyper-

trophy with dilatation ; slight dyspnœa, increased on exertion ; a florid skin, and the appearance of unusually good health. In more severe cases, increased dyspnœa, flushed countenance, and bright eye ; headache, vertigo, active hæmorrhage from the nose, or from the hæmorrhoidal vessels ; and a tendency to local inflammations. In a still more advanced stage, all the above symptoms are increased in severity, and œdema supervenes, usually beginning in the face, and gradually extending to other parts of the body. There is often the most profuse sweating. In the end, the hypertrophy is complicated with some visceral disease, which is the immediate cause of death.

PHYSICAL SIGNS.—Impulse of the heart greatly increased in force, prolonged and extending over a large space, visible to the eye, and strongly raising the hand of the observer ; the first sound of the heart obscure, when there is little or no dilatation ; louder, more abrupt, and heard over a larger space, where dilatation is at the same time present ; the second sound obscure in the former case, unusually distinct in the latter. When the palpitations are most violent, there is the bellows sound, but it disappears with repose. On percussion, there is dullness, varying with the degree of enlargement, and most extensive where dilatation is combined with hypertrophy. In some instances there is prominence and increased breadth of the left side of the chest. When the right side of the heart is affected, the dullness on percussion is most marked behind the lower part of the sternum, the venous pulse is strongly marked, while the arterial pulse undergoes but little change. In hypertrophy, with dilatation of the left side of the heart, the symptoms and complications are those of the general circulation, viz., active hæmorrhages and acute inflammations. When the hypertrophy affects both sides of the heart, symptoms referable to the lungs are combined with those affecting the system at large.

Complications and Secondary Affections.—Valvular disease, sometimes the cause, at others the consequence, of hypertrophy. Aneurism, hæmorrhage, dropsy, inflammatory diseases, visceral enlargement, cerebral and pulmonary apoplexy.

CAUSES.—Violent exertion, long-continued straining as in gymnastic exercises, strong mental emotions, plethora, obstructions in the large vessels or in the heart itself, long-continued palpitations, inflammation of the lining membrane or of the pericardium ; chronic diseases of the lungs.

PROGNOSIS.—The disease may continue for many years, and generally proves fatal in consequence of some secondary affection.

TREATMENT.—Perfect quiet of body and mind, a spare diet, gentle aperients, the occasional cautious abstraction of blood

from the arm, or from the region of the heart by cupping. A combination of opium and digitalis in small doses (five drops of the one with ten drops of the other, given three times a day), and the external application of the emplastrum belladonnæ.

REMEDIES.—Hydrocyanic acid; mercury? opium, or digitalis, applied externally to a blistered surface; counter-irritants?

ATROPHY OF THE HEART.

SYMPTOMS.—The pulsations of the heart small and feeble, the impulse much weaker than natural, and scarcely felt by the hand, and the sounds indistinct. The pulse is very compressible, small in atrophy without dilatation, and full in atrophy with dilatation.

CAUSES.—Compression of the heart by deposits of fat, by effusion of fluid, by tumors, or by any other mechanical cause; contraction of the coronary arteries; chronic diseases attended with great emaciation, such as phthisis; typhus fever, eruptive fevers. &c.

TREATMENT.—Nutritious diet, with tonics or stimulants, according to the degree of the existing debility. The disease itself does not admit of cure.

DILATATION OF THE HEART.

SPECIES.—Dilatation with hypertrophy (*active*), dilatation with thinness of the parietes (*passive*).

For the symptoms of dilatation with hypertrophy, see Hypertrophy.

SYMPTOMS of *Dilatation with Thinness of the Parietes*.—This is of most common occurrence on the right side. A fluttering of the heart; a full, frequent, weak, and irregular pulse; swelling of the veins of the neck; distinct venous pulse; great dyspnœa; a dusky skin; a bloated and anxious countenance; drowsiness; slight delirium; dropsical effusions.

PHYSICAL SIGNS.—Feeble impulse, felt, however, over a greater extent than usual; first sound short and peculiarly distinct, heard over a great extent of the chest both before and behind. In dilatation with hypertrophy, strong impulse with clear sound.

CAUSES.—Obstruction to the pulmonary circulation, pulmonary emphysema, long-standing diseases of the lungs, valvular diseases of the left side of the heart.

PROGNOSIS.—Unfavorable, but in the absence of severe complications, of dropsical effusions, or of great debility, the patient may survive for a considerable period.

TREATMENT.—Repose of body and mind, careful regulation of the diet, aperient medicines. Gentle opiates or sedatives

may occasionally be of service to allay irritability. If the circulation be greatly embarrassed, small bleedings by cupping or leeches may be had recourse to. For the treatment of hypertrophy with dilatation, see Hypertrophy.

Partial dilatation, or true aneurism of the heart, consists in a protrusion of some portion of the parietes of the heart, in consequence of ulceration of the muscular tissue, and is an equally rare, obscure, and fatal disease. Its general symptoms differ little from those of more general dilatation of the cavities of the heart; the physical signs are equally obscure; the prognosis of the disease, when recognized, is in the highest degree unfavorable, and the treatment similar to that for more general dilatation: complete repose of body and mind, the cautious use of narcotic and sedative remedies, and, in cases of extreme urgency, cautious local depletion.

CYANOSIS—BLUE DISEASE.

SYMPTOMS.—A blue color of the skin, lips, and lining membrane of the mouth; universal coldness of the surface; palpitation; fits of extreme dyspnoea, sometimes almost amounting to asphyxia; faintness, or actual syncope, on slight exertion, or from mental excitement; feeble and irregular pulse; oedema or dropsical effusions.

ANATOMICAL CHARACTERS.—A communication between the two sides of the heart, or the two sets of vessels arising from it, with disproportionate strength of the two ventricles, generally combined with narrowing of the pulmonary artery. Extreme contraction of the pulmonary artery alone.

PHYSICAL SIGNS.—A very loud and superficial murmur immediately over the seat of the communication.

PROGNOSIS.—Death during a paroxysm at an early age; in rare instances the patient attains the adult age; and in one case recorded by Louis, the age of fifty-seven.

TREATMENT.—Rest of mind and body, pure air, warm clothing, strict diet, careful attention to the state of the stomach and bowels, cautious treatment of complications.

DISEASES OF THE PERICARDIUM.

HYDRO-PERICARDIUM . . . Dropsy of the Heart.

HYDRO-PERICARDIUM.

SPECIES.—1. Active, from inflammatory action in the pericardium. 2. Passive, from obstruction to the circulation.

SYMPTOMS.—In the case of *active* effusion, the result of in-

flammatory action, the symptoms of pericarditis are, or have been, present. (See Pericarditis.)

The symptoms of *passive* dropsy of the pericardium are generally obscure. They are, a sense of weight and oppression in the præcordia, dyspnœa or orthopnœa, a dusky, suffused countenance, a tendency to syncope, œdema, and a small, frequent, and irregular pulse. The patient usually sits up in bed, and is fearful of making the least exertion, or the slightest change of position.

PHYSICAL SIGNS.—In the case of considerable effusion, striking prominence of the præcordia, with bulging of the corresponding intercostal spaces, extensive dullness, reaching sometimes from nipple to nipple, and nearly the whole length of the sternum; the pulsations of the heart imperceptible in the supine position, and shifting their place in the erect and semi-erect posture; the sounds indistinct in the region of the heart, but more audible at the upper part of the chest; the dullness on percussion varying its situation and extent with the posture of the patient. This part of the diagnosis requires the patient to assume successively the supine, and the erect or semi-erect postures, and to lie on either side.

PROGNOSIS.—Extremely unfavorable.

CAUSES.—Long-continued obstructions to the circulation of blood through the lungs, or through the parietes of the heart.

TREATMENT.—That of dropsies in general, by drastic purgatives, diuretics, &c., modified according to the state of the patient and existing complications. Paracentesis has been recommended, and, in a few cases, practiced with success. When the disease is dependent upon organic affections of the heart or lungs, such an operation is inadmissible, but when the disease is strictly idiopathic and dependent upon local inflammation, it might be resorted to, after the failure of other means.

DISEASES OF THE ARTERIES.

ANEURISM.

ANEURISM OF THE AORTA.

SPECIES.—1. Thoracic; 2. Abdominal.

ANEURISM OF THE THORACIC AORTA.

SYMPTOMS.—The general symptoms produced by an aneurismal tumor in the chest are the same as those due to any other tumor of equal size and similar situation: *dyspnœa*, by encroaching on the lungs, or pressing on the air passages; *aphonia*, by compressing the recurrent laryngeal nerves; *dys*

phagia, by pressing on the œsophagus ; *obstruction to the venous circulation*, accompanied in extreme cases by dropsical effusions into the cellular membrane of the face, neck, chest, and upper extremities, by compressing the large venous trunks ; *neuralgia of the back*, and *paraplegia*, from pressure on the spine, followed by absorption of the vertebræ ; *inanition*, by pressing on the thoracic duct.

DIAGNOSIS.—This is sometimes very difficult, when the tumor occupies the origin of the aorta, or the commencement of the coronary arteries, or when, whatever be its situation, it is of small size. When the tumor is situated in the more remote portions of the aorta, or in its first branches, and especially when it has so far increased as to rise out of the chest, the diagnosis becomes comparatively easy. When, again, the tumor, as it gradually increases in size, causes the protrusion of the sternum or ribs, or leads to their gradual absorption, we are much assisted in the diagnosis, for in such cases there is always a *prima facie* evidence in favor of aneurism.

The circumstances which would tend to confirm our first suspicion as to the nature of the tumor are, pulsation of the tumor ; sudden and copious hæmorrhage of bright red blood, or a less amount often repeated, from the lungs or stomach ; a *whizzing* or bellows sound, sometimes single, and more rarely double, in the situation of the tumor ; a peculiarly thrilling sensation communicated to the hand ; and a quick, thrilling pulse, generally much increased in frequency. Hæmorrhage from the lungs will obtain additional value as a sign of aneurism in the ascertained absence of symptoms of pulmonary consumption. When the tumor occupies the arch of the aorta, or the large vessels of the neck, or upper extremity, we may expect to find some marked change in the pulse at the wrist, and in the neck. Sometimes there is an absence of the pulse at the wrist, of one or of both arms, and occasionally of one or both carotid arteries ; and there are signs of disturbed circulation through the brain, as giddiness, faintness, and indistinctness of vision. It is necessary to add, that the peculiar whizzing sound and the *bruit de soufflet* are not always present in cases of aneurism.

PROGNOSIS.—Unfavorable, but guarded, as a natural cure is sometimes effected. The disease may last for a considerable period before it proves fatal.

TREATMENT.—Perfect repose of mind and body, temperance, a moderate diet, a free state of bowels, occasional cautious depletion when urgent symptoms require it ; a belladonna plaster to the region of the heart, and digitalis in moderate doses to keep down the action of the heart.

ANEURISM OF THE ABDOMINAL AORTA.

SYMPTOMS.—These also vary with the size and situation of the tumor, and the viscera upon which it presses. When the aneurism presses on the stomach, it gives rise to severe symptoms of dyspepsia; on the nerves of the solar plexus, to neuralgic pains; on the bowels, to obstinate constipation, or violent colic; on the nerves issuing from the spine, to severe pains in the loins, abdominal parietes, or lower extremities, simulating rheumatism of those parts, or sciatica, or lumbar or psoas abscess, or disease of the spine. By pressure on the rectum, it has sometimes led to a suspicion of stricture of that part, and it has been confounded with disease of the liver, spleen, or kidney. When the tumor occupies the upper portion of the abdominal aorta, it may thrust up the diaphragm, and give rise to dyspnoea, and other symptoms of pulmonary disease.

DIAGNOSIS.—By careful examination, the tumor may often be found to occupy the situation of the aorta; it may be felt strongly pulsating, and having the peculiar *thrill* just described; and on applying the stethoscope, a short, harsh, bellows murmur may be distinctly heard. The pulsation is more uniformly diffused over an aneurismal tumor than over any other abdominal tumor lying over the aorta; and the bellows sound is more harsh and grating than that occasioned by the pressure of such other tumors.

The *prognosis* and *treatment* are the same as those of aneurism of the thoracic aorta.

DISEASES OF THE VEINS.

PHLEBITIS Inflammation of the Veins.
PHLEGMASIA DOLENS.

PHLEBITIS—INFLAMMATION OF THE VEINS.

SYMPTOMS.—When occurring in the superficial veins, swelling and induration, sometimes accompanied by redness, in the course of the vein; pain greatly increased by pressure; œdema of the cellular tissue, and enlargement of the veins below the seat of the disease; repeated rigors, followed by typhoid fever, profuse sweats, offensive diarrhœa, great debility, anxiety, and irritability; a very frequent, weak, and sometimes intermittent pulse; and a yellow, muddy skin. As the disease advances, the joints often become painful and tender to the touch, and symptoms of inflammation of the viscera or their serous investments sometimes show themselves.

CAUSES.—*Predisposing.*—Cachexia. *Exciting.*—In rare in-

stances, cold; in the majority of cases, inflammation spreading from surrounding tissues, or injury done to the vein itself, as in the operations of bleeding, amputation, extraction of tumors, tying varicose veins, &c. Phlebitis is also very apt to supervene on fractures or operations performed on bones. It often originates in injuries to the veins of the internal viscera, as of the uterus after childbirth, the umbilical cord of new-born children, surgical operations on hæmorrhoidal tumors, &c.

ANATOMICAL CHARACTERS.—Ingestion and infiltration of the coats of the vein; effusion of coagulable lymph or pus from the external or internal surface of the vessel; formation of coagula; pus in remote veins; deposits of pus in the joints and serous cavities, or in the lungs, liver, spleen, or kidneys. The most common position of these deposits is the liver, when the veins of the abdominal viscera are the seat of the disease; and the lungs, when the disease occupies the external veins of the body.

DIAGNOSIS.—From absorbent inflammation by the larger size of the inflamed vessel, the vein feeling like a large, hard, knotted cord.

PROGNOSIS.—Generally unfavorable, but guarded; more favorable in inflammation of the external veins, and especially in those cases which arise spontaneously, or from cold. Less favorable in traumatic phlebitis, and in that originating from injury to the veins of the internal viscera.

TREATMENT.—Leeches in the course of the inflamed vessel (bleeding from the arms is counter-indicated). A position favorable to the return of blood to the heart, warm fomentations, or, if more agreeable to the patient, cold lotions. If the accompanying fever is of the inflammatory type, tartar-emetic and aperients, or calomel and opium; if of the typhoid type, wine, brandy, and diffusible stimulants, in combination with opium.

PHLEGMASIA DOLENS—PHLEGMASIA ALBA.

SYMPTOMS.—From one to five weeks after delivery, a painful elastic swelling of one or both lower extremities, beginning generally in the groin, labia, and thigh, and thence extending downward; characterized by great heat and tenderness, a pale, shining appearance of the surface, and stiffness of the limb. It is commonly ushered in by rigors, with pain in the loins or belly; and is accompanied by fever, thirst, a quick and frequent pulse, headache, nausea, and a furred tongue. The disease sometimes proves fatal, but more commonly subsides in about a fortnight or three weeks, leaving the limb swollen and weak.

CAUSES.—*Predisposing.*—The puerperal state. *Exciting.*—

Inflammation of the internal or external iliac and femoral veins, or of the veins of the uterus and viscera of the pelvis.

DIAGNOSIS.—From *Œdema*, by the elastic nature of the swelling, and the absence of pitting on pressure. From common inflammation of the cellular tissue and skin, by the pale, shining aspect of the surface.

PROGNOSIS.—Generally favorable, but recovery tardy.

TREATMENT.—Leeches to the most painful parts of the limb; warm fomentations; opium in large doses, with calomel, blue pill, or hydrargyrum c. cretâ, given so as to affect the mouth. From half a grain to a grain of opium, with two grains of blue pill, may be given three or four times a day, till the system is sensibly affected. The limb should be kept in the horizontal position or slightly raised, and the bowels should be acted on by gentle aperients. If there is much fever present, a sixth of a grain of tartar-emetic may be combined with the opium and blue pill.

CHAPTER III.

DISEASES OF THE ORGANS OF RESPIRATION.

1. Of the Larynx and Trachea.
2. Of the Bronchial Tubes and Air Cells.
3. Of the Substance of the Lungs.
4. Of the Pleura.

DISEASES OF THE LARYNX AND TRACHEA.

LARYNGITIS	Inflammation of the Larynx.
TRACHEITIS	Croup.
LARYNGISMUS STRIDULUS .	Crowing Inspiration.

LARYNGITIS—INFLAMMATION OF THE LARYNX.

SPECIES.—1. Acute; 2. Chronic.

ACUTE LARYNGITIS.

SYMPTOMS.—After rigors, followed by pyrexia, and usually by some degree of inflammation in the tonsils; there is hoarseness; a husky and convulsive cough; pain in the larynx, generally increased by pressure, with a sense of constriction in that part, and constant hawking of glutinous mucus; the respiration difficult and sonorous; the act of swallowing painful, and often followed by convulsive fits, coughing, and dyspnœa. There is inflammatory fever, with flushed face, hot skin, full and hard pulse. The fauces are generally red and swollen; and, if the tongue be pressed downward and forward, the epi-

glottis may be seen thickened and inflamed. These symptoms are followed by others of greater severity and more formidable character. The countenance becomes pale and anxious; the lips livid; the eyes suffused; the nostrils expanded; the pulse frequent, feeble, and irregular; the voice reduced to a whisper, or lost; the throat often œdematous. There is extreme restlessness; jactitation; urgent fear of suffocation; sleeplessness, or, if the patient doze, he wakes in a dreadful agitation, gasping and struggling for breath. Delirium and coma ensue, and death takes place in from four to five days, or the patient dies at an earlier period asphyxiated.

ANATOMICAL CHARACTERS.—Injection and thickening of the lining membrane of the larynx, with œdema of the submucous cellular tissue; the glottis and epiglottis red and swollen, and containing serum, sero-purulent fluid, or pus; œdema of the surrounding cellular membrane. In some cases, œdema of the glottis is the only post-mortem appearance.

CAUSES.—*Predisposing.*—Previous attacks of cynanche tonsillaris, intemperance, abuse of mercury, frequent and long-continued exertions of the voice; the adult age. *Exciting.*—Exposure to wet and cold; extension of inflammation from the tonsils or salivary glands; swallowing scalding or corrosive liquids; inhaling acrid gases or hot air; extension of inflammation in erysipelas, scarlatina, small-pox, and measles.

DIAGNOSIS.—From diseases of the chest by the local affection, and the absence of the physical signs of those diseases; from spasmodic affections of the larynx by the presence of fever and local pain, and by the gradual progress of the disease; from tracheitis, by the absence of the peculiar stridulous voice, and of the croupy inspiration.

PROGNOSIS.—Most unfavorable; more so when the disease has already lasted some time, with an increase of the symptoms, when the dyspnœa is extreme, the convulsive fits of frequent occurrence, the face livid, the circulation languid, and the head affected. On the other hand, a decrease of dyspnœa, a free expectoration, an improved aspect of countenance, and greater ease in swallowing, are favorable signs.

TREATMENT.—*Indications.*—I. To reduce inflammatory action, and prevent effusion. II. Effusion having taken place, to promote the absorption of the effused matter. III. In extreme cases, to remove the mechanical obstruction to the respiration.

I. Inflammatory action can be reduced and effusion prevented only by the most prompt and active measures. Bleeding to the *approach* of syncope, repeated if necessary, and followed by tartarized antimony, in combination with calomel and opium in full doses. We may give two, three, or four grains of cal-

omel, with from an eighth to a sixth of a grain of tartarized antimony, and a third or half of a grain of opium every one, two, or three hours, according to the urgency of the symptoms. The object of this treatment is to reduce inflammation by means of the tartar-emetic, to supersede inflammatory action by inducing salivation as speedily as possible by the mercury, and to soothe existing irritation by the opium. The local treatment, in the early stage, consists in leeches to the throat. (Counter-irritants should be reserved for the more advanced stages of the complaint.) Rough ice should be held in the mouth, and applied round the throat.

II. The second indication is fulfilled by mercury, and by that alone. This remedy should be resorted to without loss of time. It may be taken internally, and rubbed in at the same time. When effusion has actually taken place, bleeding is of little use, except to counteract the urgent symptoms which may supervene. Counter-irritation may now be employed with advantage in the form of blisters, acetum cantharidis, or strong ammonia to the side of the neck. Where laryngitis supervenes on other diseases, the treatment must be appropriate to both complaints, and be modified according to the state of the system.

III. The mechanical effects of the inflammation and effusion can be obviated, and the obstruction to the respiration removed only by making an opening into the trachea. This operation should not be delayed too long. When, in spite of remedies, the dyspnœa increases rapidly, and there is urgent danger of suffocation, an operation should be resorted to without loss of time. After the operation, the edges of the opening must be kept separated, so as to admit the free passage of air.

Throughout the treatment, the patient should be prevented from talking.

CHRONIC LARYNGITIS.

SYMPTOMS.—Hoarseness, sometimes increasing till the voice is reduced to a whisper, or quite lost; dry, husky cough; pain or soreness in the larynx, increased by lateral compression or backward pressure. The cough is brought on by any unusual exertion, or by the inhalation of cold air, and is accompanied, in the first stage, with scanty mucous expectoration; in more advanced cases, and where ulceration is present, with pus, mixed with streaks of blood; or there is a sanious fetid expectoration. In confirmed cases, dyspnœa is an invariable attendant, coming on generally in paroxysms, and leaving the patient nearly free in the intervals. In the last stage of the disease the dyspnœa is increased to orthopnœa, obliging the

patient, during the fits, to sit up in bed. In the intervals of the paroxysms, the breathing has a peculiar hissing sound. The patient does not long survive the appearance of orthopnoea, and generally dies asphyxiated.

ANATOMICAL CHARACTERS.—Inflammation and its consequences in the mucous and submucous textures of the larynx; enlargement of the mucous follicles; œdema; ulceration of the mucous membrane; ossification, or caries of the cartilages.

CAUSES.—The acute form, of which it is often the sequel; catarrh; indulgence in spirituous liquors; excessive exertions of the voice; injuries to the larynx; the inhalation of air loaded with dust or irritating particles of matter; syphilis; the abuse of mercury; tuberculous matter deposited in the mucous membrane of the larynx. Ulceration from this cause occurred in about a fourth of the cases of phthisis quoted by Louis.

DIAGNOSIS.—The permanent change of the voice, the cough, the hissing breathing, and the pain or tenderness in the larynx, will serve to distinguish this from other forms of disease. The tuberculous variety may often be distinguished from the effect of simple inflammation or relaxation, by the co-existence of the symptoms and physical signs of phthisis. (See Phthisis Pulmonalis.)

PROGNOSIS.—This will depend on the history of the case. The absence of signs of disease of the chest is favorable; as is also its evident dependence upon some mechanical cause, or on syphilis. The continuance of the symptoms, without intervals of freedom, is highly unfavorable.

TREATMENT—Indications.—I. To reduce the chronic inflammation. II. To promote the absorption of effused fluids. III. In cases of relaxation of the mucous membrane, to restore tone to the part. IV. To relieve urgent symptoms. V. To improve the general health.

I. The chronic inflammation of the larynx may be subdued by the repeated application of a few leeches to the upper part of the throat, and by counter-irritants, such as blisters, mustard-poultices, and tartar-emetic ointment. The part itself should, at the same time, be kept at rest, the patient being prevented from talking more than is necessary, and never above a whisper.

II. To fulfill the second indication, the promotion of absorption, mercury should be given in small doses, so as to affect the mouth, or the hydriodate of potash, in five-grain doses, three or four times a day.

III. To restore the tone of the relaxed mucous membrane, various remedies have been recommended: the inhalation of steam holding some gentle stimulant in solution, as ammonia,

camphor, turpentine, or one of the balsams ; or the still stronger stimulants, applied directly to the part, in a liquid or solid form. Nitrate of silver, corrosive sublimate, and sulphate of copper, have been recommended for this purpose. The preference should be given to the nitrate of silver, which may be used in the proportion of one or two parts in four of water, applied by means of a roll of paper, or a piece of sponge to the epiglottis, or injected by means of a syringe. If solid substances are preferred, they must be used in the form of an impalpable powder, and drawn into the larynx through a tube. Trisnitrate of bismuth ; or calomel with twelve times its weight of sugar ; or red precipitate, sulphate of zinc, and sulphate of copper, mixed with thirty-six times their weight of sugar ; alum with twice its weight ; and acetate of lead with seven times its weight, are the remedies recommended by MM. Trousseau and Belloc. (See Lib. Pr. Med., vol. iii., p. 51.)

IV. The urgent symptoms consist chiefly in paroxysms of dyspnœa or convulsive cough. These may be relieved by narcotics and sedatives, as opium, æther, camphor, belladonna, or stramonium, inhaled or given internally. Where urgent symptoms are found to admit of no relief, an operation may be necessary.

V. The improvement of the general health may be brought about by the usual remedies, such as tonics, especially steel, nourishing and wholesome diet, bracing air, the cold or shower bath, and strict attention to the stomach and bowels, and to the state of the secretions generally.

TRACHEITIS—CYNANCHE TRACHEALIS—THE CROUP.

SYMPTOMS.—The disease generally creeps on imperceptibly, beginning with hoarseness and wheezing, short dry cough, and sometimes a rattling in the throat during sleep ; restlessness, the child often raising the hand to the throat. The difficulty of breathing increases, and at length becomes indescribably anxious ; the face is flushed, and the veins of the neck swollen ; the voice, in speaking and coughing, acquires a shrill and peculiar sound, similar to the crowing of a cock, or to the noise which a fowl makes when caught in the hand. The sound of inspiration at first resembles the passing of air through a piece of muslin ; afterward through a metallic tube. At the commencement of the disease, the cough is dry ; soon, however, a viscid matter is brought up, with portions of film or membrane of a whitish color ; and the efforts made to expectorate these are often so distressing as to threaten strangulation. It is accompanied with the symptoms of inflammatory fever, and most frequently terminates fatally about the second or third day, when the patient expires from suffocation.

ANATOMICAL CHARACTER.—Inflammation of the lining membrane of the trachea, and the consequent formation of a false or adventitious membrane, which may extend from the trachea into the bronchi, and become so thick as to fill the windpipe and cause suffocation. Large portions of this matter, bearing the shape of the tube, have been expelled by vomiting. The inflammation generally extends upward to the larynx as well as downward to the bronchi.

CAUSES—*Remote and Predisposing.*—Its attack is mostly confined to children between the ages of three and thirteen years. *Exciting.*—It is most frequent in low and damp situations, and on the sea-shore. It may be induced by any of the causes of inflammation. It has been epidemic, and is by some supposed to be contagious.

DIAGNOSIS.—The peculiarity of breathing, of speaking, and of coughing, above described, are the pathognomonic symptoms.

From Laryngismus Stridulus.—This disease attacks children of the same age, and is attended with symptoms much resembling those of croup. Distinguished by its consisting of repeated paroxysms, having an interval of twelve or fifteen hours; by the attack being more sudden, and not at first attended with fever; and by being unattended with expectoration.

PROGNOSIS—*Favorable.*—Early and copious expectoration, the breathing not much impeded, the voice little changed, the febrile symptoms moderate.

Unfavorable.—Great anxiety and difficulty of breathing, violent fever, the sound of the voice becoming more acute, no expectoration.

[The distinctive sign most to be relied upon is the existence of patches of exudation, resembling oftentimes small ulcers in the fauces, seen when these parts are carefully inspected. The existence of this morbid secretion was, we believe, first pointed out by Dr. Ware, of Boston, and is regarded by him as giving a decidedly unfavorable prognosis, even after the child has been relieved by remedies.]

TREATMENT—*Indications.*—I. To subdue inflammation. II. To promote the absorption of the effused lymph. III. To obviate urgent symptoms.

I. The first indication is fulfilled by bleeding from the arm, or, in the case of very young children, by the free application of leeches to the larynx and trachea. The abstraction of blood should be followed up by a warm bath and tartar-emetic in nauseating doses, combined with the remedies necessary to fulfill the second indication. The treatment may be commenced by an emetic of from half a grain to a grain of tartar-emetic, according to the age of the child. The bowels should also be freely opened.

II. This indication requires the use of submuriate of mercury, administered so as to excite salivation, and combined with the tartar-emetic.

As it is important to affect the system as rapidly as possible, mercurial ointment may be rubbed into the thighs or axillæ. Mercury may be used with the more freedom in children, as the system is with difficulty affected by it.

III. If the symptoms become extremely urgent, the false membrane may sometimes be brought up by the operation of an emetic; but if suffocation is threatened, the operation of tracheotomy must be performed. This operation, however, will not always be successful, as the inflammation often extends to the bronchial tubes, which are filled with false membrane. The operation of tracheotomy is best performed by laying bare the cartilaginous rings of the trachea, raising them with a hook, and removing a lozenge-shaped piece with a scissors or bistoury.

Venæsection; leeches along the trachea; an emetic; the warm bath; a sinapism to the throat for a quarter of an hour; and repeated doses of calomel, in combination with tartar-emetic, form the principal items of the treatment.

[We rely more upon venæsection than upon any other mode of bleeding when the abstraction of blood is deemed necessary. The application of leeches is attended with too much delay in a disease requiring so prompt treatment as croup; besides, the long exposure of the throat and thorax during their application must very materially interfere with the remedial effects of the leeches.]

In extreme cases, sinapisms or blisters should be applied to the legs; and in the case of children, the former should not be left on more than five or ten minutes, and the latter above three hours.

LARYNGISMUS STRIDULUS—SPASMODIC CROUP.

SYNONYMS.—Crowing inspiration, child crowing, spasmodic asthma of children.

SYMPTOMS.—The principal feature of the disease is a remarkable crowing inspiration, unattended by cough, coming on suddenly, and often on first waking from sleep. For a short time the child makes ineffectual efforts to inspire air, and struggles violently, but at length the difficulty is overcome, and the breath is drawn in with a loud crowing sound. If the impediment is less complete, the respiration is hurried and laborious, each inspiration being attended by the peculiar crowing sound; the face becomes livid, the eyes staring and suffused, convulsions supervene, the thumbs are clinched in the hands, the fingers and toes are flexed, and the joints of the

wrist and ankle forcibly bent. In extreme cases, death takes place by asphyxia, or the little patient falls, pale and exhausted, into the nurse's lap.

PATHOLOGY.—Irritation reflected through the inferior or recurrent laryngeal nerve upon the muscles of the larynx, in consequence of remote irritation of the gums, bowels, &c. ; a diseased condition of the bronchial and cervical glands, producing irritation of the eighth pair and recurrent nerves.

CAUSES.—*Predisposing.*—Infancy ; from birth to the age of three years ; the scrofulous diathesis. *Exciting.*—Teething ; intestinal irritation ; worms ; enlargement of the absorbent glands of the neck and chest ; cutaneous affections of the scalp and face.

DIAGNOSIS.—*From Croup,* by the sudden accession and departure of the fits ; the freedom of the breathing in the intervals, and by the absence of febrile or catarrhal symptoms ; and, except in rare cases during the fit, of cough. Also by the presence of hot and swollen gums, glandular enlargements of the neck, and symptoms of intestinal irritation.

PROGNOSIS.—The disease sometimes proves fatal, but more commonly terminates favorably.

TREATMENT.—*During the Paroxysm.*—The warm bath, hot water to the throat, fresh air, and sprinkling of the face and chest with cold water. *During the Intervals.*—The treatment must depend on the existing causes of irritation. When these are removed, if the disease should still continue, change of air, with a diet adapted to the child's age, and attention to the state of the bowels, will generally effect a cure.

Spasmodic diseases of the larynx, marked by croupy respiration, convulsive cough or loss of voice, are of frequent occurrence in females, and belong to the long list of anomalous affections which are apt to occur in hysteria. They must be treated in the same way as other hysterical symptoms.

DISEASES OF THE BRONCHIAL TUBES AND AIR CELLS.

CATARRHUS	Catarrh.
CATARRHUS EPIDEMICUS	Influenza
BRONCHITIS	Bronchitis.
ASTHMA	Asthma.
PERTUSSIS	Hooping-cough.
EMPHYSEMA	Emphysema.

CATARRHUS—CATARRH.

Acute catarrh, or what is commonly called "a cold," is a febrile affection, complicated in the majority of cases with in-

flammation of one or other of the mucous membranes. If confined to the mucous membrane of the eyes and nostrils, it is called *coryza*, or *cold in the head*; if it extend to the bronchial tubes, it is termed *bronchitis*; if it attack the mucous membrane of the bladder, it becomes a *catarrhus vesicæ*. Sometimes the inflammation, instead of attacking the mucous membrane of the air passages, affects that of the alimentary canal, and is attended with sickness and diarrhœa, or with both together, assuming the form of gastritis, enteritis, or gastro-enteritis mucosa. Its essential characters, therefore, are an increased secretion of mucus from the lining membrane of the nose, fauces, bronchi, intestinal canal or bladder, attended with pyrexia.

SYMPTOMS.—Slight rigors followed by pyrexia; weight and pain in the head; oppression of the chest, and impeded respiration; sense of fullness and stopping up of the nose; watery, inflamed eyes; cold shiverings, succeeded by transient flushes of heat; soreness of the fauces and trachea; herpetic eruptions on the lips; cough; pains about the chest; rheumatic pains in the back, neck, and head; increased secretion of mucus from the mucous membrane of the nose, fauces, bronchi, &c. It may be acute or chronic: when it assumes the chronic form, the symptoms are those of inflammation of the mucous membrane originally affected. As this is most frequently the mucous membrane of the air passages, catarrhus and bronchitis are frequently employed as synonymous terms. The term catarrh is here used to designate a febrile affection, complicated with inflammation of one or other of the mucous membranes; those inflammations being afterward treated as separate diseases.

CAUSES—Remote.—Cold applied to the body; contagion?

PROGNOSIS.—It is seldom attended with immediate danger, but often lays the foundation for serious diseases.

TREATMENT—Indication.—To reduce the existing fever and allay irritation.

If the fever run high, the best remedy is tartar-emetic in nauseating doses and at short intervals, with cooling drinks and saline purgatives; but where the fever is inconsiderable, or the cold stage still continues, an opposite plan of treatment will be equally effectual, and the above indication may be fulfilled by ten grains of Dover's powder given over night, followed by the pediluvium, a basin of warm gruel, and a hot bed. By these means a profuse perspiration is excited, which effectually removes the febrile action. The Dover's powder may be followed up next morning by a brisk aperient. A large draught of cold water will often effectually remove a common cold. The treatment of the accompanying inflamma-

tion must vary with the mucous membrane affected. If the symptoms are those of coryza in the severe form, relief may be obtained by holding the head over the steam of hot water, or bathing the eyes repeatedly with warm water. For the remedies appropriate to the other inflammations, see the diseases themselves.

CATARRHUS EPIDEMICUS—INFLUENZA.

SYMPTOMS.—Rigors, lassitude, weariness, severe pains in the head, back, and loins, followed by flushing, feeling of weight in the head and oppression at the chest, redness and suffusion of the eyes, sneezing and tingling at the nose, with an acrid discharge from the nostrils, herpetic eruption on the lips, redness and soreness of the fauces and tonsils, a frequent short cough, with expectoration, at first of a thick, viscid mucus, afterward of opaque, muco-purulent, or purulent matter. The pulse is small and frequent at the commencement of the disorder, and toward the decline often becomes slow, and sometimes irregular. There are loss of appetite, nausea, or vomiting, a furred tongue, the urine scanty and turbid, the skin at first hot and dry, afterward covered with profuse perspiration. With these symptoms there is extreme prostration of strength, loss of energy, and depression of spirits. Sometimes there is extreme debility without accompanying local symptoms.

TERMINATIONS AND COMPLICATIONS.—Bronchitis, pneumonia, pleuritis; inflammation of the brain or its membranes; muscular and articular rheumatism; cynanche tonsillaris; diarrhoea and dysentery; skin disease; erysipelas; typhus.

CAUSES.—The disease is epidemic, and dependent upon some peculiar condition of the atmosphere.

DIAGNOSIS.—From *common Catarrh*, by the greater prevalence of the complaint, and by the extreme debility which attends and follows it. From *common Ephemeral Fever*, by the extreme prostration, and, in many cases, by the herpetic eruption on the lips.

In the recent epidemics, 1844–45, several cases of influenza have assumed a well-marked remittent character, with exacerbations on alternate days. The herpetic eruption on the lips has served to show the real nature of the malady.—(G.)

PROGNOSIS.—Rarely fatal to the young and robust, unless it be complicated with very severe local affections; dangerous to the feeble and aged.

TREATMENT.—In mild cases, that of catarrh; in severe ones, and in aged persons, stimulants, combined with opiates, and local treatment appropriate to the existing complication. General blood-letting is contra-indicated, except in very rare

instances, the local remedies being generally sufficient to remove or mitigate any symptoms which may occur. The state of the bowels should be carefully attended to, and the diet must be strictly regulated. Throughout the treatment it must be borne in mind that the debility is real, not the result of oppression of the nervous power, but a depression of strength. For the treatment of the local complications, see the several diseases themselves.

BRONCHITIS.

SPECIES.—1. Acute; 2. Chronic; 3. Bronchitis, vel catarrhus, senilis.

ACUTE BRONCHITIS.

SYMPTOMS.—The general symptoms are those of catarrh in its most severe form, or they are those of common continued fever. The symptoms referable to the chest are oppression and sense of constriction, rarely attended with actual pain within the chest, but often combined with muscular pains, which are a part of the original catarrh, or the consequence of the effort of coughing: the pain is not increased by a deep and slow inspiration. There is dyspnœa, increased by exertion and cough, attended with expectoration, which is scanty at first, then more copious, of a white, glairy appearance, resembling white of egg; in still more advanced stages, it is muco-purulent or purulent, and sometimes tinged with blood. The symptoms are generally more severe toward evening, when there is an increase of feverish symptoms. In favorable cases, the severity of the symptoms abates between the fourth and eighth day; the dyspnœa subsides, the expectoration gives more relief, the febrile symptoms disappear, and the patient recovers, or the disease passes into the chronic form. Acute bronchitis often occurs in children: its most severe and urgent form has received the name of suffocative catarrh.

CHRONIC BRONCHITIS.

SYMPTOMS.—Is the sequela of the acute form, or commences as a common cold in the young and middle aged, and continues a month or two. In the middle aged, or old persons, it returns every winter with increased severity, and reappears for several years in succession, in which case it is called winter cough. When the mucous membrane secretes freely, and the breathing is difficult, the disease is called humoral asthma. The expectoration may be copious or sparing, and of all characters, even purulent; being sometimes inodorous, at others extremely fetid. It varies in color and

consistence. In severe cases there is dyspnœa or orthopnœa, and great pulmonic congestion. The pulse is commonly small and feeble, and there is often great prostration of strength, in which case the secretion of the lungs is expectorated with difficulty, and the patient may die suffocated. The sufferings of the patient are often increased by flatulence.

CATARRHUS SENILIS.

SYMPTOMS.—This, as the name implies, is a disease of advanced age. Its symptoms are dyspnœa, wheezing, cough, orthopnœa, abundant mucous expectoration, drowsiness, extreme debility, cold extremities. The patient expires slowly and without suffering, suffocated by the accumulated mucus which he has no longer strength to expectorate. It generally occurs in more than one winter in succession before it proves fatal.

ANATOMICAL CHARACTERS.—Redness of the tracheal or bronchial mucous membrane to a greater or less extent. This redness is observed most commonly at the termination of the trachea, and in the first divisions of the bronchi. There may be purulent expectoration though the mucous membrane appears perfectly healthy.

PHYSICAL SIGNS.—Sound on *percussion* clear, or slightly duller than natural. Sonorous and sibilant rhonchi in the first stage, followed by the mucous and submucous rhonchi. These sounds are often heard without applying the ear to the chest. The death *rattles* are caused by an accumulation of mucus in the bronchial tubes.

EFFECTS OF BRONCHITIS.—The effects of chronic bronchitis are partial or extensive dilatation of one or several bronchial tubes, evidenced by bronchophony; or, where the dilatation is partial and of considerable extent, by pectoriloquy. These sounds are heard either over the site of the larger bronchial tubes, or in parts of the chest in which such tubes do not exist.

Another effect of bronchitis is emphysema. The disease may also become converted into pneumonia. Diseases of the heart may follow the long continuance of bronchitis. Dyspepsia is a common accompaniment of the chronic form of the disease. Ascites and anasarca supervene in the last stage of bronchitis.

TREATMENT—Of acute Bronchitis.—In very acute attacks, occurring in persons previously in strong health, general blood-letting, followed by tartar-emetic in nauseating doses, may be necessary. When the disease is less severe and the general health is unimpaired, local depletion, followed by

counter-irritants to the chest, will be required, and the compound squill pill, alone or in combination with extract of conium, given three or four times a day. When the cough comes on in fits, a lozenge containing a sixth of a grain of extract of stramonium often proves serviceable.

In the chronic form of bronchitis the treatment must be nearly the same as in the milder form of the acute disease, except that local depletion will rarely be required, unless in case of severe exacerbations. The compound squill pill is here an excellent remedy, and it may be advantageously combined with Dover's powder, or the extract of conium. When there is a considerable collection of mucus in the air tubes, an emetic may be given early in the morning, or twice in the week. The chest and body should be kept warm, and the chest itself may be protected by a full-sized emplastrum roborans.

In Bronchitis Senilis.—When the debility is extreme, and in all cases of *bronchitis senilis*, the appropriate remedy is a combination of stimulants and narcotics. One of the best consists of five grains of sesquicarbonate of ammonia, with five minims of laudanum in an ounce of mistura camphoræ. In extreme cases, still stronger stimulants are required. When dropsical effusions supervene, stimulants, diuretics, and expectorants are indicated. In the bronchitis of children, emetics are very serviceable by promoting expectoration.

REMEDIES—*In chronic Bronchitis.*—Oil of turpentine, balsam of copaiba, lobelia inflata, colchicum, and the inhalation of chlorine, iodine, or tar vapor.

It is important that those who are subject to bronchitis, or who labor under it in the chronic form, should avoid all unnecessary exposure to cold. This is more especially necessary in the bronchitis of old people, which is greatly aggravated by exposure to cold. The rooms which they inhabit should, therefore, be kept warm, and as nearly as possible of a uniform temperature; the chest and extremities should be carefully protected from cold; and they should avoid exposing themselves to cold air. If obliged to leave their rooms during the winter, they should use a respirator, or, what answers nearly as well, a folded handkerchief held before the mouth. In many cases, exposure to cold air gives temporary relief, but the symptoms return with renewed severity when the circulation is restored by the warmth of the room.

ASTHMA.

CHARACTER.—Dyspnœa occurring in paroxysms, with intervals of freedom of respiration.

SPECIES.—1. Humoral asthma, bronchorrhœa, or bronchial

flux; 2. Congestive asthma, or dry catarrh; 3. Spasmodic asthma.

HUMORAL ASTHMA.

SYMPTOMS.—The attack is usually preceded by a sense of fullness about the stomach, lassitude, depression of spirits, drowsiness, and pain in the head. On the approach of evening, a sense of tightness is perceived across the breast, with distressing difficulty of respiration. The difficulty of breathing continues to increase for some length of time; both inspiration and expiration are performed slowly, and with a wheezing noise; the speech becomes difficult and uneasy; cough succeeds, followed by the most anxious difficulty of breathing; the patient is threatened with immediate suffocation, and is obliged instantly to rise from the horizontal position; the face is sometimes turgid, and of a livid hue; at others it is morbidly pale and contracted. These symptoms usually continue till toward the approach of morning, when a copious expectoration of a thin frothy mucus comes on, the breathing becomes less laborious and more full, the patient speaks and coughs with greater ease, and feeling every way relieved, soon falls asleep. The dyspnœa and tightness across the chest remain for some days after the attack, and for several succeeding evenings an exacerbation occurs similar to that above described.

ANATOMICAL CHARACTERS.—Not constant. The mucous membrane is generally free from disease; but some affection of the heart, particularly of the right side, is not uncommon. Miliary tubercles, and extensive disease of the bronchial glands, have been met with in fatal cases.

PHYSICAL SIGNS.—Sound on percussion generally good, but in extreme cases dull. Sonorous and sibilous rhonchi at the commencement of the attack, followed by the mucous, submucous, and subcrepitant rhonchi. Some degree of wheezing and sibilus usually remains after the attack.

CAUSES.—*Predisposing.*—Hereditary peculiarity; lax habit of body; long-continued dyspepsia; gout.

Exciting.—Sudden changes of temperature; disorders of the primæ viæ, especially flatulence; certain effluvia, as of hay or ipecacuanha.

DIAGNOSIS.—The pathognomonic symptoms are, paroxysms generally coming on at night, in which there is frequent and extremely anxious respiration; together with a wheezing noise, and sense of tightness across the chest.

PROGNOSIS.—*Favorable.*—Youth and unimpaired constitution, and the absence of organic disease. *Unfavorable.*—Repeated attacks; old age; debility; organic disease.

TREATMENT—*Indications*.—I. To shorten the paroxysms and relieve urgent symptoms. II. To prevent the recurrence of the fits, by removing the predisposing and exciting causes.

I. The first indication may be fulfilled by an emetic at the onset of the attack, but this is inadmissible where there is great debility. In strong and healthy persons, full doses of tartar-emetic, of ipecacuanha, or the lobelia inflata, in the form of tincture, in doses of from twenty to thirty drops, may be given with great advantage. In the debilitated, stimulants are required, such as strong coffee, ammonia, or æther. These may be combined with opium in moderate doses. Heat applied to the extremities, or to the entire surface, by means of the warm or vapor bath, is extremely serviceable, but should be applied at the onset of the attack. Where the fit has already lasted some time, and the expectoration is abundant, provided that at the same time there are no very severe or dangerous symptoms, it is best to leave the patient to himself, as the increased secretion is the best relief to the breathing.

II. The exciting causes must be carefully avoided, the general health must be preserved, and the state of the digestive organs be carefully attended to. The bowels should be kept free, but hypercatharsis must be avoided; liquids should be taken in moderation; the diet should consist of a due mixture of animal and vegetable food, but acescent fruits and such vegetables as occasion flatulence should be taken sparingly. The internal remedies will vary with the state of the system.

I have found alum, in combination with ginger, very serviceable in removing the distressing flatulence which often precedes and accompanies the fit. Ten grains of the one, with five grains of the other, and three or four grains of rhubarb, may be given three or four times a day. I have also more than once met with tenderness on pressure in the cervical and dorsal regions, and have used tartar-emetic ointment with much benefit.—(G.)

CONGESTIVE ASTHMA.

This resembles the foregoing variety in coming on in paroxysms of severe dyspnœa, but differs from it in the scanty expectoration which accompanies the cough, and terminates the fit. The physical signs are those belonging to a swollen state of the mucous membrane of the air tubes, viz., clear sound on percussion, indistinct respiratory murmur, with sibilant rhonchi, or a peculiar click, and, in limited portions of the chest, the mucous rhonchi.

ANATOMICAL CHARACTERS.—A deep red or violet color of the mucous membrane of the air tubes, with scanty mucous secretion.

CAUSES.—Dyspepsia, exposure to wet and cold, and organic disease of the heart, leading to obstructed circulation.

PROGNOSIS.—Generally favorable, except where the disease is of long standing, or complicated with other functional or organic derangements.

TREATMENT.—Dry cupping and counter-irritation to the chest, expectorants, as squills, ipecacuanha, or colchicum in combination with alkalies, the inhalation of steam holding some stimulant in solution, such as tar vapor or ammonia. Smoking stramonium is sometimes found advantageous. Strict attention must be paid to the state of the digestive organs, the bowels must be kept free by aloetic purgatives, and the general health must be carefully attended to.

SPASMODIC ASTHMA.

This term is applied to dyspnœa occurring in paroxysms, unaccompanied by signs of congestion or inflammation of the bronchial tubes, and presumed to depend on a spasmodic action of the muscular fibres of the air-tubes.

SYMPTOMS.—Sudden and extreme dyspnœa; a feeling of constriction in the chest, as if a cord were bound tightly round it; the countenance suffused, and expressive of intense anxiety and distress; the superficial veins distended; the skin covered with a profuse perspiration. The body is bent forward, the arms resting on the knees, the shoulders are raised, the abdomen contracted, and all the muscles of respiration are thrown into violent action.

PHYSICAL SIGNS.—Sound on percussion less clear than usual, respiratory murmur very faint, and occasionally accompanied with slight wheezing or whistling. If the patient is desired to hold his breath for a few seconds, or to count until the air in the chest is exhausted, and then to inspire slowly and steadily, the air will be found to enter as usual. The respiratory murmur soon becomes feeble again. The distinctive physical sign, then, of spasmodic asthma, is imperfect respiratory murmur, *except after holding the breath*, when it becomes as loud as, or even louder than, usual.—(Williams.)

CAUSES—Predisposing.—The same as in other spasmodic diseases; hereditary peculiarity; hysteria. *Exciting.*—Attacks of dyspepsia; extreme flatulence; irritation of the upper part of the spinal cord; pressure of tumors on the pulmonary plexus or on the par vagum; peculiar odors, as of hay, the smell of a stable, of ipecacuanha, &c.

PROGNOSIS.—Favorable in the absence of complications. It is dangerous when combined with other diseases of the lungs, or with those of the heart. It often lays the founda-

tion of emphysema, pulmonary congestion and hæmorrhage, dilatation and hypertrophy of the heart, &c.

TREATMENT—*Indications*.—I. To relieve the patient's sufferings during the fit. II. To improve the general health, and give tone to the system during the intervals.

I. When the fit has actually commenced, some relief may be afforded by counter-irritants to the chest, epigastrium, and extremities ; by antispasmodics, as æther, opium, belladonna, asafœtida, and valerian ; and by strong coffee. This latter remedy has been strongly recommended by Pringle and Laennec. When the patient is aware of the approach of a fit, he may sometimes ward it off by an emetic, or by smoking stramonium or tobacco. Dashing cold water over the face and body will often succeed in preventing a paroxysm. Electricity has been used with the same view. The ascertained causes of the fit must of course be carefully avoided.

II. The state of the digestive organs demands peculiar attention : the diet should be light, wholesome, and easy of digestion ; all substances which encourage flatulence should be avoided. The state of the bowels must be carefully attended to. For the improvement of the general health, the shower bath or cold spunging, followed by frictions of the chest, should be employed every morning, and tonics should be administered in full doses. The preparations of iron, zinc, silver, or bismuth, are the best. Where much flatulence is present, alum in combination with ginger may be given with advantage. If there is tenderness in any part of the spine, leeches may be applied, or the tartar-emetic ointment, or both. When the spasm of the bronchial tubes is combined with congestion of the mucous membrane, or increased secretion, the treatment must be varied accordingly. Depletion or counter-irritation must be employed with antispasmodic remedies. The same strict attention to the diet, to the state of the bowels, and to the general health, will be required in every form of asthma.

Spasmodic asthma is sometimes confounded with a totally different disease, which has its seat in the external muscles, and is closely allied to chorea and hysteria. It is characterized by extraordinary frequency of the respiration, and by the perfectly healthy sound of the chest and breathing. It is sometimes also a marked symptom of paralysis agitans, the muscles of respiration partaking of the affection of the other muscles. A remarkable case of spasmodic asthma occurred in a female aged twenty-two, who came under my notice some years back as a patient of the Surrey Dispensary. The paroxysms, which were of variable duration, were characterized by extreme frequency of breathing, with comparatively

little general disturbance of health, and perfect freedom of respiration. There was amenorrhœa, some tenderness of the upper part of the spine, and constipation. The disease was cured by purgatives judiciously and perseveringly administered. No other remedy was employed. Hypercatharsis was invariably followed by a paroxysm. I have recently seen a case of the same kind in which there were 140 respirations to 144 pulses. In this case much benefit was derived from cold affusion.—(G.)

PERTUSSIS—HOOPING-COUGH.

SYMPTOMS.—The disease comes on with slight difficulty of breathing, thirst, quick pulse, hoarseness, cough, and all the symptoms of common catarrh. In the second or in the third week after the attack, it assumes its peculiar and characteristic symptoms. The expiratory motions, peculiar to coughing, are made with more rapidity and violence than usual; and after several of these expirations thus convulsively made, a sudden and full inspiration succeeds, accompanied by a peculiar hoop, from which the disease has obtained its name. When the sonorous inspiration has happened, the convulsive coughing is again renewed, and continues in the same manner as before, till a quantity of mucus is thrown up from the lungs, or the contents of the stomach are evacuated by vomiting, which generally terminates the fit: the patient has then most frequently an interval of perfect freedom from cough, and often expresses a desire for food; but when the attack has been severe, it is succeeded by much fatigue, hurried respiration, and generally by languor and debility. After a longer or shorter continuance of the disease, the paroxysms become less severe, and at length entirely cease. In some instances, however, it has been protracted for several months, and even for a year.

CAUSES.—Children are most commonly the subject of the disease; and it is supposed to depend on a specific contagion; at first it is a nervous disorder, but may be followed by pulmonary or cerebral congestion, or inflammation.

DIAGNOSIS.—It is distinguished from every other disease by the convulsive cough, followed by the peculiar sonorous inspiration above described; and by its terminating in vomiting or free expectoration.

PROGNOSIS.—*Favorable.*—Moderate and free expectoration; the strength little impaired; the fits neither frequent nor violent; in the interval, the respiration free; the appetite good; the absence of fever; moderate hæmorrhage from the nose.

Unfavorable.—The disease occurring in children under two years of age; in children born of phthisical or asthmatic parents; much fever, with symptoms of pneumonia: very copi-

ous or scanty expectoration ; great debility ; convulsions, or coma.

TREATMENT.—*Indications.*—I. To keep up a constant state of nausea, so that the fit may be more promptly finished by vomiting. II. To reduce existing inflammation of the lungs.

These two indications may be perfectly fulfilled in a large majority of cases by the same remedy, viz., tartar-emetic in doses sufficiently large to keep up a constant state of nausea. From a twelfth to a sixth of a grain, according to the age of the patient, may be given at short intervals, either alone, or in combination with a grain of hydrargyrum c. cretâ. The bowels must, at the same time, be kept free by gentle aperients, the diet must consist of bland farinaceous substances, and the patient must be carefully guarded from cold, and kept in a pure warm air. No other remedies are required ; but when there is extreme restlessness, and the fits are accompanied by great distress, the tartar-emetic may be combined with opium, or the antimonial wine with laudanum. Half an ounce of antimonial wine with a drachm of laudanum, and distilled water in sufficient quantity to make a mixture of *ziss.*, will form a very good combination. The dose may be a tea-spoonful once, twice, or thrice daily. When the expectoration is brought up with difficulty, an emetic should be given once, twice, or thrice a week.

If there are signs of inflammation in the lungs, the tartar-emetic must be continued in increased doses ; one or more leeches may be applied to the chest (the most convenient place is the upper bone of the sternum), followed, if necessary, by counter-irritants, hot water, or mustard poultices to the extremities ; and, in fact, the treatment appropriate to pneumonia. If there is determination of blood to the head, leeches to the temples and cold applications. When the severity of the disease has passed away, change of air is the best restorative. Existing debility must be treated by tonics, of which the best are the preparations of steel.

REMEDIES.—The nauseating remedies, as tartar-emetic, and ipecacuanha, with or without laudanum, tincture or extract of hyoscyamus, sirup of poppies, extract of lettuce, &c. ; prussic acid, belladonna, digitalis, musk, camphor, cochineal, oil of amber, cantharides. Counter-irritants.

EMPHYSEMA.

SYMPTOMS.—Permanent shortness of breath, increased to extreme dyspnœa by occasional exciting causes, as exercise, flatulence, or a common cold ; and, in extreme cases, by assuming the horizontal posture. Fits of dyspnœa coming on suddenly in the night, and obliging the patient to sit up, and

to open the doors and windows of his room for air. These fits are accompanied by severe palpitations of the heart, blueness of the face and lips, œdema, and dropsical effusions. There is usually some cough, with scanty expectoration, which varies in character, consisting in most cases of a thin mucus, mixed with small tenacious clots, and filled with air-bubbles. The expectoration is increased by a supervening attack of bronchitis. The general aspect of the body undergoes a change by the long continuance of the malady; the countenance becomes pale, the body is emaciated, and the legs and abdomen swell.

PHYSICAL SIGNS.—Peculiarly clear sound on percussion, with indistinct respiratory murmur; to which is sometimes added a dry crepitous rhonchus, with occasional loud clicking sound, or a friction sound, similar to that of a finger rubbed on a table. When there are complications, the physical signs of such complications are superadded. In marked cases, the chest is enlarged and rounded in all directions. When the emphysema is confined to one lung, or to a part of one lung, the chest is irregularly enlarged. The respiratory movements are indistinct, and the respiration is abdominal.

ANATOMICAL CHARACTERS.—Enlargement of the air cells, or rupture of the air cells into each other, or into the subserous cellular membrane (interlobular emphysema). The lungs increased in volume.

PROGNOSIS.—The disease is not fatal in itself, but dangerous by laying the foundation for other diseases.

TREATMENT.—I. During the paroxysms. II. During the intervals.

I. During the Paroxysms.—The fits may be greatly relieved by a combination of opium and diffusible stimulants. From 20 drops to ʒss. of laudanum, with from half a drachm to a drachm of spirits of sulphuric æther, may be administered at the onset of the fit. The shoulders should be well raised, the doors and windows should be thrown open, at the same time that the body, and especially the lower extremities, are kept warm. In extreme cases, cupping between the shoulders, or the cautious abstraction of blood from the arm by a small orifice, may become necessary. When the patient has reason to apprehend an attack, an emetic, by emptying the stomach, and removing the existing flatulence, may prevent the paroxysm.

II. During the Intervals.—The disease does not admit of cure. The treatment is partly that of the complications which may exist with it, and partly consists in a few simple precautions, such as the avoidance of colds by warm clothing and dry feet, the daily use of cold spunging or the shower bath,

regular and moderate meals, aloetic aperients, liquids in small quantity, and the avoidance of the causes of flatulence. If flatulence exist, a combination of alum, rhubarb, and ginger (ten grains of the first, three of the second, and five of the third), taken twice or thrice a day, or a dinner pill, containing the same or similar ingredients, taken daily an hour before dinner.

DISEASES OF THE SUBSTANCE OF THE LUNGS.

PNEUMONIA	Inflammation of the Lungs.
GANGRÆNA PULMONUM	Gangrene of the Lungs.
HÆMOPTYSIS	Spitting of Blood.
PHTHISIS PULMONALIS	Pulmonary Consumption.

PNEUMONIA—PNEUMONITIS—INFLAMMATION OF THE SUBSTANCE OF THE LUNGS.

SYMPTOMS.—The disease sometimes sets in with rigors, followed by pyrexia; at others, the local symptoms are the first to show themselves. There is high fever, with increased heat of surface, especially on the chest; flushed face; injection of the eyes; headache; frequent, quick, and compressible pulse; thirst; furred tongue; anorexia; weakness; and pain in the head and limbs. The symptoms referable to the chest itself are a diffused, dull pain, deep-seated, rarely acute, unless the disease involves the pleura; a short and dry cough, accompanied at first with scanty mucous expectoration, but after the lapse of one or two days with a rusty-colored, viscid sputum; the respiration is frequent and short, rising from 13 or 14 (the probable number in the recumbent posture in health) to 30 and upward.

In favorable cases, this disease may decline on the third or fourth day; more frequently it is protracted to ten days or a fortnight. In unfavorable cases the symptoms increase on the third or fourth day; the respiration becomes more and more frequent; the sputa of a deeper hue, of a more viscid consistence, and often streaked with blood; the pulse increases in frequency and feebleness; the tongue is dry and covered with a brown fur; the skin hot and pungent to the touch; the debility extreme; delirium and coma come on, with all the symptoms of typhoid fever. In the last stage, the expectoration loses its viscid character, and becomes a thin, reddish-brown fluid; the dyspnœa increases; the pulse is small and fluttering; the countenance pallid; the lips livid; the skin covered with a clammy sweat; there is increasing rattle in the throat; and at length the patient dies exhausted, asphyxiated, or comatose.

ANATOMICAL CHARACTERS.—Corresponding to the first stage of the disease, *sanguineous congestion*; to the second, *red hepatization*; to the third, *yellow hepatization*, or *diffused suppuration*.

PHYSICAL SIGNS.—At the onset, puerile respiration; when the disease is fairly established, and during the stage of congestion, *crepitant rhonchus*; in the stage of hepatization, absence of respiratory murmur, bronchial respiration, and bronchophony; in the third stage (that of suppuration), *mucous rhonchus*. Throughout the disease, dullness on percussion, which is most marked during the stage of hepatization. The parts most commonly affected are the lower lobes of one or both lungs; and the physical signs are most strongly marked at the lateral and posterior parts of the chest. When pneumonia terminates in abscess (*vomica*), the physical signs are those of tuberculous excavations. (See *Phthisis pulmonalis*.)

VARIETIES AND COMPLICATIONS.—Supervenes on typhus, small-pox, measles, erysipelas, and scarlatina, when it is often obscure, and liable to be overlooked. Great heat of chest, unusual dyspnoea, and sudden aggravation of the symptoms should lead the practitioner to suspect this complication. The physical signs are nearly the same as in idiopathic pneumonia. It is also apt to attack patients laboring under plithisis, is a frequent concomitant of bronchitis, and comes on occasionally after severe injuries and surgical operations. Sometimes it is combined with pleurisy (*pleuro-pneumonia*).

CAUSES—*Remote and Predisposing*.—Sanguineous temperament, vigorous and plethoric habit, winter and spring seasons, vicissitudes of temperature, violent exercise of the body, or exertions of voice, a peculiar state of the atmosphere.

Exciting.—All the common causes of inflammation; vicissitudes of temperature, violent exercise of the body, or exertions of voice; congestion occurring from common causes, or in the course of various febrile diseases; affections of the lungs and heart.

DIAGNOSIS.—The pathognomonic symptoms are, the peculiar rusty tinge of the sputa, the crepitous rhonchus, and the peculiar heat and pungency of the surface of the chest. The history of the case, added to these symptoms, will rarely leave any difficulty. The history will also serve to distinguish idiopathic pneumonia from typhus fever with chest complication.

PROGNOSIS—*Favorable*.—An early and copious mucous expectoration, the small crepitation changing to the distinct mucous r  le; spontaneous h  morrhage from the nose; warm, equable, and free diaphoresis; diarrh  a; the appearance of inflammation on an external part; the urine depositing a sediment; diminished frequency of respiration: this is an ex-

tremely favorable symptom, and one which should be carefully looked for ; the absence of complication ; the disease being of limited extent.

Unfavorable.—The duration of the disease beyond the fourteenth day ; violent symptoms of fever and delirium, or those of typhus with low delirium or coma ; great drowsiness ; no expectoration, or the expectorated matter tinged with blood, or of a dark or black color ; sudden cessation of pain, followed by a change of countenance, and a sinking or irregularity of the pulse ; the symptoms indicating suppuration or suffocation ; a previously broken constitution ; complications ; increasing frequency of respiration ; the disease extending to the whole lung or to both lungs ; occurring in very young children, or in the aged and debilitated.

TREATMENT.—This must vary with the stage of the disease. *During the first stage*, or that of congestion, the remedies are, free bleeding from the arm, to be repeated if necessary, followed by a brisk purgative of calomel (5 gr. to ℥i.) ; and tartar-emetic, in half-grain doses, at intervals of one or two hours. The quantity may be increased to a grain, or even more. This medicine may always be advantageously combined with calomel. Half a grain of tartar-emetic with two of calomel may be given every one or two hours with the best effect. This combination, in doses proportioned to the age, is of great efficacy in the pneumonia of infants.

In the second stage, or that of hepatization, local bleeding, by cupping or leeches, with counter-irritation, must be substituted for general bleeding, and calomel and opium given frequently, so as to affect the gums, for the tartar-emetic. If, however, there is high fever, the tartar-emetic may still be continued in combination with the calomel ; but if typhoid symptoms have already supervened, stimulants are called for. Of these, the best is ammonia, in combination with camphor.

In the third stage, or that of suppuration, stimulants will be required, such as ammonia, æther, and wine ; if the fetid character of the sputa announces the presence of gangrene, still stronger stimulants will be necessary.

The foregoing remedies must be employed with due regard to the severity of the local disease, as well as of the general symptoms. When bleeding is employed, its effects should be carefully watched. Debility, in the absence of marked typhoid symptoms, does not counter-indicate it, and if the pulse rises under its use, it may be continued with advantage. The diet must be strictly antiphlogistic in the first stage ; nourishing and stimulant if typhoid symptoms supervene ; nourishing, but not stimulating, during convalescence. The patient's room should be of a moderate and equable temperature (about 60°);

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the head should be raised as much as the patient's strength will allow, and the posture should be changed from time to time.

If a chronic form of pneumonia continues after the severe symptoms have been removed, a course of mercury, external counter-irritation, tartar-emetic in small doses, the hydriodate of potash with sarsaparilla, or Plummer's pill, with change of air, regular exercise, and temperate diet, may be resorted to. The patient requires to be closely watched during his convalescence, and the chest should be examined from time to time.

GANGRÆNA PULMONUM—GANGRENE OF THE LUNGS.

SYMPTOMS.—Extreme prostration of strength; a frequent feeble pulse; expectoration of dingy-green sputa, mixed with blood, and of a peculiarly offensive odor; mucous rhonchus; the symptoms of typhus; and death from exhaustion.

CAUSES.—Acute pneumonia; inflammation occurring in extremely feeble constitutions.

DIAGNOSIS.—The peculiar color and offensive odor of the sputa.

PROGNOSIS.—Highly unfavorable; especially when the disease involves a large portion of the lungs; more favorable where it is limited in extent.

TREATMENT.—Strong stimulants, as in gangrene affecting other parts.

HÆMOPTYSIS—SPITTING OF BLOOD.

SYMPTOMS.—Sense of weight and oppression in the chest often referred to one spot; dry tickling cough; pulse generally frequent, sharp, and compressible; difficulty of breathing; saltish taste in the mouth; flushed countenance; constant irritation at the top of the larynx, which excites hawking and coughing, followed by bloody expectoration. There are generally slight febrile symptoms. In some cases the mouth constantly fills with blood, without cough or irritation of the throat.

PHYSICAL SIGNS.—The chest sometimes affords the natural sound on percussion, and there is slight mucous râle; at other times there is dullness on percussion over a limited spot surrounded by crepitant rhonchus. In the former case the hæmorrhage is from the bronchial tubes (bronchial hæmorrhage); in the latter, blood is effused into the substance of the lungs (pulmonary apoplexy).

CAUSES.—*Predisposing.*—A certain age; from the period of puberty to the forty-fifth year; sanguineous temperament; plethora; narrow conformation of the chest; previous attacks of the same disease; hereditary predisposition.

Exciting.—Excessive heat of the atmosphere ; violent exercise ; inordinate exertion of the organs of respiration, as in public speaking, singing, &c. ; external violence ; tubercles in the lungs ; gangrene of the lungs ; suppression of usual or habitual evacuations, especially of the menstrual discharge ; hypertrophy of the left side of the heart, purpura hæmorrhagica, and purpura nautica.

The most common cause of hæmoptysis is the existence of tubercular matter in the lungs, the hæmoptysis in some cases preceding, in others following, the appearance of the other symptoms of pulmonary consumption. The next in point of frequency is vicarious hæmoptysis, the consequence of amenorrhœa. Less frequent still is hæmoptysis dependent on disease of the heart, or rupture of an aneurism ; least frequent of all hæmorrhage, accompanied by the formation of so-called bronchial polypi.

DIAGNOSIS.—The blood being brought up by coughing, generally in small quantities, or mouthfuls at a time, of a florid red color ; and preceded by, or mixed with, a little frothy mucus. An abundant sudden discharge of *florid* blood would alone lead us to regard the hæmorrhage as coming directly from the lungs, being poured out either by its own vessels, or in consequence of the rupture of an artery communicating with the air passages.

From Hæmatemesis.—The blood thrown up in hæmatemesis is usually in much larger quantity ; of a darker color ; more grumous ; mixed with other contents of the stomach ; and usually unattended with cough.

From Hæmorrhage from the Nose, Fauces, or Gums.—By careful examination of those parts, and the history of the case.

PROGNOSIS.—As regards the disease itself, the prognosis is generally favorable, when the hæmorrhage is not in very large quantity suddenly poured out. It is also favorable when taking the place of the menses in amenorrhœa. In most other cases, in both sexes, its occurrence must excite suspicion of the existence of tubercles ; in the ascertained absence of tubercles, there would be reason to fear disease of the heart. When the hæmoptysis is preceded or followed by the expectoration of bronchial polypi, the prognosis is also favorable.

TREATMENT—Indications.—I. To remove congestion where that exists. II. To keep the circulation quiet. III. To restore the relaxed vessels to their healthy condition.

I. The first indication is best fulfilled by bleeding from the arm. The circumstances which justify the adoption of this remedy are plethora, a full, frequent, and jerking pulse, great dyspnœa, a flushed countenance, and abundant hæmorrhage. When the countenance and skin are pale, the pulse small and

weak, the respiration little affected, and the hæmorrhage inconsiderable, bleeding is not required. Bleeding is also contra-indicated when hæmoptysis occurs in the course of an attack of phthisis. Leeches or cupping may be substituted for general bleeding when the abstraction of blood is less urgently required.

II. Low diet, perfect repose, fresh, cool air, cold liquids, or ice taken internally, and applied externally, with gentle laxatives, will fulfill the second indication. The head of the patient should be raised, and he should be forbidden to speak, except in a whisper, and then as little as possible. If after bleeding there is still some febrile action, tartar-emetic in doses of from one eighth to one fourth of a grain may be given every three or four hours.

III. After existing congestion or febrile symptoms have been removed, or in cases where there has been from the first no congestion or fever, the third indication will be fulfilled by remedies belonging to the class of astringents, such as dilute sulphuric acid in doses of twenty drops, or the acetate of lead, in doses of from five or six to fifteen grains daily, given with an excess of acetic acid, and combined with tincture of opium, or hyoseyamus and digitalis. Twenty drops of dilute sulphuric acid, with five of laudanum, and ten of digitalis, three or four times a day, may be given with advantage; or the acetate of lead, and acetic acid, may be substituted for the dilute acid.

REMEDIES.—Nitrate of potass in full doses; ipecacuanha (two grains every quarter or half hour till the hæmorrhage ceases); the same in combination with opium; the ergot of rye; Ruspini's styptic (an alcoholic solution of gallic acid); mercury.

PHTHISIS PULMONALIS—PULMONARY CONSUMPTION.

SYMPTOMS.—Tubercular phthisis usually begins with a short, dry cough, occurring, for the most part, on first rising in the morning, and so slight as to become habitual before it excites the attention of the patient. It is sometimes accompanied by slight dyspnœa, increased on exertion, and there is generally some degree of languor, weakness, and emaciation. The patient is soon fatigued, and is easily thrown into a perspiration; slight dyspeptic symptoms, diarrhœa, and frequent headaches, and a small, frequent, quick pulse, are also among the early symptoms, and, on inquiry, the patient will often recollect that he has formerly spit blood.

After these symptoms have continued for a variable period of several weeks, months, or even years, in consequence of a cold, or some trivial exciting cause, the cough becomes more

habitual, and is particularly troublesome during the night ; the dyspnœa increases ; there are shooting pains in the chest ; expectoration takes place, at first of a frothy mucus, which afterward becomes more viscid and opaque, and is often mixed with small round particles of tubercular matter, with pus, or with streaks of blood ; or hæmoptysis occurs in a more marked form, and to a greater extent.

As the disease advances, the cough and dyspnœa become more urgent ; the expectoration more abundant ; the emaciation and weakness more considerable ; the pulse more frequent ; the face flushes toward evening, and hectic fever sets in, followed toward morning by profuse perspiration ; the urine is high-colored, and deposits a branny sediment ; the palms of the hands and soles of the feet are affected with burning heat ; the tongue, from being white, is now preternaturally clean and red. The appetite now often mends, and generally becomes better than in the first stage of the complaint. Profuse diarrhœa, sometimes tinged with blood ; colliquative sweats ; extreme emaciation ; the falling off of the hair ; œdema of the legs ; aphthæ in the mouth and throat ; hectic fever in its most marked form, and a very feeble, rapid, and often irregular pulse, usher in the fatal termination. Still the appetite often remains entire, and the patient flatters himself with the hopes of speedy recovery, and is often vainly forming distant projects of interest or amusement, when death puts a period to his existence.

ANATOMICAL CHARACTERS.—Tubercular matter in the form of miliary tubercles or granulations, scattered through the lungs ; or of opaque yellowish-white masses infiltrated into their texture. Cavities, of various size and shape, sometimes found in every part of the lung, but generally confined to the upper lobes, larger and more numerous on the right than on the left side. In the larynx and trachea, ulcerations (in the larynx in one fifth of his cases, in the trachea in one third, Louis). In the intestines, also, ulcerations (in five sixths of Louis's cases). The liver enlarged and changed in appearance and consistence (the fatty liver). Tubercular deposits in various organs of the body.

PHYSICAL SIGNS.—In the incipient stage, before suppuration sets in, dullness on percussion over the clavicles and in the supra and infra-clavicular regions. This dullness is sometimes common to both sides, but generally greater on the one side than on the other. In the majority of cases, the dullness is most marked on the right side. Similar dullness between the scapulæ. The upper part of the chest in some instances is obviously contracted, the clavicles being very prominent, the supra-clavicular regions deeply hollowed, the anterior and

upper part of the chest flattened, and the shoulders thrust prominently forward. The stethoscopic indications are, a roughness in the respiratory murmur; a prolonged expiratory sound; bronchial respiration heard more distinctly on one side than the other, and most to be depended on as a sign of incipient phthisis when heard toward the point of the shoulder; mucous, sub-mucous, and sibilant rhonchus; a slight click; slight crepitant rhonchus; increased resonance of the voice; in some cases, extremely indistinct respiratory murmur.

In *confirmed* phthisis, the physical signs are less obscure. They consist of a more distinct click or bubbling sound, which is most distinctly heard when the patient coughs or takes a full inspiration; cavernous rhonchus; cavernous respiration; pectoriloquy; amphoric resonance; metallic tinkling; distinct gurgling, when the patient coughs; and in rare cases, equally distinct sound of fluid in motion on succussion. The situation in which these sounds occur, and the limited space which they occupy, will generally serve to distinguish phthisis from other conditions of lung productive of the same or similar sounds. The peculiar distinctness of the heart's beat over the entire chest may be mentioned as a common concomitant of phthisis.

The character of the sputa may be classed with the physical signs. At first they are opaque and muco-purulent, as in bronchitis; they then become purulent, often sink in water, and sometimes contain particles of clotted matter, like softened cheese; in rare instances, distinct portions of pulmonary tissue are spit up; streaks or small clots of blood are often mixed with the expectoration; pus is often expectorated in distinct masses, resembling "irregular balls of flock or wool, of a yellow or greenish color, sinking and breaking down in water."

COMPLICATIONS.—Bronchitis, pneumonia, pleurisy, followed by adhesions or pneumothorax. Extensive disease of the liver; inflammation of the peritoneum; anasarca; ulceration of the larynx and trachea; ulceration of the intestines; in rare cases, head affections.

DURATION.—The average is about two years. In acute cases, from a few months to one or two years; in chronic cases death often takes place after the lapse of years, and after repeated attacks; in very acute cases, in three weeks or a month.

CAUSES — *Predisposing*. — Hereditary predisposition; the scrofulous diathesis; adult age. The male sex? particular formation of the body, marked by a long neck, prominent shoulders, narrow or deformed chest, long, slender fingers, with large ends and filbert nails; thin upper lip; a fine clear skin, delicate complexion, fine hair, varying from light to

dark chestnut, light blue or gray eye, with large pupil and long eyelash; or the black hair, dark eye, and sallow complexion; sedentary life; bad air; insufficient and unwholesome food; depressing passions of the mind, as grief, disappointment, anxiety; dissipation and intemperance; profuse evacuations, as diarrhœa, diabetes, fluor albus, menorrhagia; hyperlactation; and all causes of debility.

Exciting.—Foregone attacks of pneumonia, catarrh, asthma, scrofula, syphilis, variola, rubeola. The dust to which certain artificers are exposed, as needle-pointers, stone-cutters, millers, &c.; irritating fumes.

DIAGNOSIS.—The symptoms and physical signs taken together render the diagnosis of confirmed phthisis easy; some difficulty will be experienced in cases of complication with other chest affections; but no precise rules can be laid down for distinguishing such complications from the uncombined diseases themselves. The history of the case, the symptoms, and the physical signs combined, will rarely leave any doubt. The diagnosis, however, is often difficult in the early or incipient stage.

The following observations may facilitate the distinction. The first onset of phthisis is marked by very slight and very variable symptoms. One patient complains merely of debility; a second, of debility and slight emaciation, for which he can assign no cause; a third, of distressing perspiration on slight exertion; a fourth, of constant headache; a fifth, of dyspepsia; a sixth, of muscular pains; a seventh, of diarrhœa; an eighth, of hæmoptysis; a ninth, of slight hacking cough, with scanty mucous expectoration in the morning; a tenth, of palpitation; and so on. Another patient has been subject to winter cough, or what he terms asthma, for years, but never suffered so much in previous winters; his cough, for the first time, continues through the summer months. A few well-directed inquiries on the part of the medical man will often, and even generally, bring to light some additional symptom actually existing, or present at some former period; but, in spite of the most careful inquiry, the case will often remain obscure, and in very many instances the physician will be led to stop at the most obvious symptom, and to direct his treatment to its removal, unsuspecting of the lurking disease which is its cause.

In all these obscure cases, there is one symptom which will stand him in good stead, and serve to arouse his suspicions; and this is the peculiar character of the pulse. This consists: 1, in increased frequency; 2, in increased quickness or sharpness; or, 3, in both combined. In the first place, with regard

to increased frequency. I have shown elsewhere* that in five out of six cases the pulse in phthisis exceeds the highest number (92) observed in *apparently* healthy males of the same mean age. In five out of six cases, therefore, the frequency of pulse taken alone will serve to excite suspicion, occurring as it does in a patient whose health and strength are but slightly impaired, and who is evidently laboring under no acute disease which could account for such increase of frequency. Sometimes this symptom is almost the first to show itself, accompanying the first feelings of weakness and indisposition, and continuing throughout the whole duration of the disease. I have known it as high as 140, where debility was the only marked symptom. 2. The quickness of the pulse; that is to say, the promptitude with which each separate pulse rises beneath the finger, is even more constant than the increase of frequency, and may exist with a pulse of 70. The pulse of health is exactly the reverse of this, rising slowly, and, as it were, deliberately beneath the finger; so also is the infrequent pulse of mere debility. To quickness is superadded smallness of pulse in phthisis, while the pulse in health is of moderate fullness. 3. The combination of the three characters of pulse—the frequency, the smallness, and the quickness—should always lead to an examination of the chest; but the small quick pulse alone is sufficient ground of suspicion. These observations apply only to the male, as the characters here pointed out form a striking contrast to those of the male pulse both in health and disease; while, on the contrary, the pulse of the female, even in health, possesses these three characters in a marked degree, and assumes them in most functional and in many organic diseases. The slight effect produced by a change from the erect to the sitting posture will also assist the diagnosis in the male, by distinguishing the debility of phthisis from simple debility due to other causes. Whenever, then, a man presents himself for advice, complaining of debility, or of other obscure symptoms of phthisis, or even of symptoms proper to functional diseases of other organs, and is at the same time obviously free from acute disease, the pulse should be examined, and if, after allowing the patient's agitation to subside, the pulse is either very small and frequent, or very small and quick, or if it combine all these characters of increased frequency, smallness, and quickness, the chest should be examined, and in by far the majority of cases the physical signs will be found to justify the suspicion raised by the pulse.—(G.)

Another symptom often present, and already cursorily alluded to, is headache, pain in the forehead and over the eyes, for which there is no obvious explanation. This symptom

* Guy's Hospital Reports, No. IX.

alone has often led me to the examination of the chest, and in the majority of instances with the result of confirming my suspicions.—(G.)

A third symptom deserving special notice is palpitation. It is often the very first symptom which engages the patient's attention.

PROGNOSIS. — *Unfavorable*, as to the ultimate event, but guarded as to the event of an existing attack. When the disease can be distinctly traced to hereditary predisposition; when there is a high degree of hectic fever; great frequency of pulse and respiration; great emaciation and debility; a morbidly clean or fiery red tongue; fixed pain in the chest; colliquative sweats or diarrhœa; profuse purulent expectoration; œdema of the legs; aphthæ; and stethoscopic indications of extensive and advanced disease, or of the supervention of pneumonia or pleuritis, the prognosis, as regards the existing attack, will be highly unfavorable.

Favorable.—The disease being limited in extent; not traceable to hereditary predisposition; slight emaciation and debility; pulse and respiration but little increased in frequency; absence of night sweats, or diarrhœa, and of complications: these circumstances justify a favorable prognosis as to the existing attack. In any case, the prognosis should be very guarded, as the patient may survive three, four, or more severe attacks in succession, and the physician may incur censure for the apparent incorrectness of his diagnosis. Where the disease is very limited, ultimate recovery is a possible, though rare event.

TREATMENT.—I. Of incipient phthisis. II. Of confirmed phthisis.

I. In *incipient* phthisis, the indications are, 1. To promote the absorption of the tuberculous matter; 2. To prevent or subdue local inflammation; 3. To improve the general health.

1. With a view to promote the absorption of tuberculous matter, two remedies have been recommended, viz., mercury and iodine; the first to be given so as slightly to affect the system; the second, in the form of the hydriodate of potash or iron. Iodine may also be inhaled with the steam of warm water. There is no sufficient reason for believing that these or any other remedies possess any power of removing tuberculous deposits.

2. Local inflammation may be prevented by guarding against cold and all those causes which excite the circulation. Warm clothing, the avoidance of exposure to wet and cold; a diet consisting chiefly or entirely of vegetable food, to the total exclusion of all stimulants; and a proper attention to the state of all the secretions, will fulfill the first part of this indication.

Inflammation, where it already exists, may be subdued by small bleedings repeated at intervals of a few days, or a week, by leeches applied over the site of the tubercular deposits, by counter-irritants to the upper parts of the chest, and, in certain cases, by small doses of tartar-emetic.

3. The general health may be improved by proper exercise, wholesome diet, regular habits, pure air, change of air, especially to the sea-side, sea-voyages, cold spunging, followed by friction every morning, and all the means in common use for this purpose.

II. In *confirmed* phthisis—that is to say, where suppuration has already taken place—the indications are, 1. To facilitate the expectoration of the products of suppuration; 2. To subdue local inflammation; 3. To mitigate distressing symptoms; 4. To support the patient's strength.

1. The first indication is fulfilled by emetics. These remedies, however, are not admissible, nor are they of use, in the advanced stages of the disease, where much debility is present. When the patient's strength is little impaired, and the expectoration is abundant, they may be given with the best effect. They should be taken on first rising in the morning, and be followed up by a moderate quantity of warm water or warm chamomile tea. Tartar-emetic in half-grain doses, or ipecacuanha, or zinc in doses of a scruple, may be given every morning, or on alternate mornings, or once or twice in the week, according to the strength of the patient. They prove most beneficial where they cause the expectoration of abundant sputa from the lungs; perhaps they are also useful by detaching the tuberculous matter from the walls of the suppurating cavity. Whatever may be the rationale of their action, their beneficial effect is beyond question.

Having made use of this remedy in a large number of cases, I am inclined to restrict its beneficial influence solely to those cases in which there is abundant expectoration. In incipient phthisis, attended with a dry cough, or scanty expectoration, emetics are as useless as they might *à priori* be expected to be.—(G.)

2. Local inflammation must be combated by the occasional application of a few leeches over the part affected, and the assiduous use of counter-irritants, of which the tartar-emetic ointment or solution is perhaps the best.

3. The most distressing symptoms are night sweats, cough, febrile flushes, palpitation, sickness, diarrhoea, and hæmoptysis. The *palpitation* may be relieved by digitalis, in doses of from five to ten drops of the tincture; the *cough*, by small doses of opium, by the compound squill pill, in combination with the extract of conium, or by small and repeated doses of

the more powerful sedatives. Of these, the best is extract of stramonium, in the dose of the sixth of a grain made into the form of lozenge, with extract of liquorice, and sucked frequently in the course of the day and night when the cough is most urgent. The *febrile flushes* are relieved by cold spunging and cooling drinks. The *night sweats* often subside under the use of the mineral acids, as the dilute sulphuric acid, in the dose of twenty drops. This may be combined, when there is much restlessness, with a quarter of a grain of morphia. The distressing *sickness* which sometimes accompanies phthisis requires the use of dilute hydrocyanic acid, in the dose of three or four drops three times a day, with a bland farinaceous diet. *Diarrhœa* commonly subsides by strict regulation of the diet, and the prohibition of every form of solid food. If this should not suffice, the common remedies for diarrhœa must be employed. That which answers best is a combination of a sixth or a fourth of a grain of sulphate of copper with the same quantity of opium. In *hæmoptysis*, the dilute mineral acids, or, if these fail, the acetate of lead with small doses of opium.

4. The patient's strength will be best supported by nourishing diet, without stimulants. In the last stage of the disease, however, stimulants, such as wine and ammonia, may be administered with advantage.

REMEDIES.—The inhalation of æther, conium, tobacco, stramonium, digitalis, iodine and chlorine, hydrogen and hydrocarbon, and the vapors of tar. Digitalis and hydrocyanic acid; quinine; tonics and chalybeates; naphtha! The Iceland or Irish moss. Change of air; a sea-voyage; uniform temperature! A residence at Undercliff in the Isle of Wight, Torquay, Hastings, and Cork; Rome, Nice, the Cape, Madeira, the West Indies.

In incipient phthisis, it is obvious that a sea-voyage, or a change of air and scene, or a change from a low, damp spot, to a dry, bracing air, would be as useful as to any other person whose health had suffered impairment from whatever cause. This is probably the extent to which change of climate is beneficial in the early stage of phthisis. As, however, it has lately been shown that, in the East Indies, there is among our troops, as well as among the natives, a remarkable immunity from consumption, a residence in that climate may be reasonably recommended, both to persons laboring under the incipient disease, and to families deeply tainted with scrofula. The places now usually recommended have not this probability in their favor, and the evidence in support of the change is on a level with that in favor of tar-water, naphtha, frictions to the spine, or dry-cupping to the chest. The fact

is, that every thing that has ever been recommended, however trivial, has seemed to cure phthisis, simply because patients laboring under phthisis do continually recover from existing attacks, and in rare instances regain perfect health, though pent up in towns, breathing the foul air of crowded workshops, living in unhealthy habitations, and surrounded by every unwholesome influence; exposed, in a word, to the continued action of the predisposing and exciting causes of the disease; while, on the other hand, many cases stated to be phthisis are merely sympathetic functional disorders of the lungs, or real diseases of the lungs of a non-tubercular origin. To recommend a change of climate in advanced stages of consumption is as unwise as it is cruel. But in incipient cases, a change may be fairly recommended, if it do not entail great inconvenience. But in all cases it is a choice of evils which ought to be fairly stated. The benefit is not sufficient to counterbalance a great amount of inconvenience or a large pecuniary sacrifice. This moderate estimate of the beneficial effect of change of climate is founded upon facts and reasonings which the narrow limits of this work do not permit to be stated.—(G.)

PROPHYLAXIS.—Persons who have an hereditary predisposition to phthisis, those who have habitually delicate health, or whose chests, on examination, prove to be unsound, require unusually careful management of their health. During childhood, nourishing and wholesome food, proper exercise, warm clothing, frequent ablution of the skin, pure air within doors, both in day and sleeping-rooms, moderate application of the mind, and careful attention to the state of the bowels, are necessary: during youth and manhood, such exercises as tend to expand the chest, especially fencing; exercise in the open air, especially horse exercise; spunging the chest every morning with cold water, followed by friction; the moderate employment of the voice in singing or in reading aloud; and careful avoidance of all excesses, bodily or mental, should be insisted on. All unwholesome employments and all sedentary occupations should be avoided. If a choice of a foreign country is to be made, the East Indies is, in all probability, the best.

[Patients are not unfrequently advised to visit the southern sections of our country to obtain the benefits of a southern climate. There is, however, but little advantage to be derived from a winter residence in any part of the continent of North America. There are often sudden changes of temperature even at the extreme south. The island of Cuba, or any other of the West India islands, is far preferable for a winter residence for an invalid than any part of the United States.]

DISEASES OF THE PLEURA.

PLEURITIS.

PNEUMOTHORAX.

HYDROTHORAX.

PLEURITIS—INFLAMMATION OF THE PLEURA.

SPECIES.—1. Acute ; 2. Chronic.

ACUTE PLEURISY.

SYMPTOMS.—This disease is generally ushered in with rigors, and the usual symptoms of inflammatory fever, accompanied or followed by a sense of weight in the chest, which in a few hours becomes acute pain, referred to the side, about the level of the nipple, and thence shooting to the sternum, clavicle, or armpit. In rare cases, it extends over the whole of the affected side. There is a short, dry cough, unless the disease is complicated with bronchitis, pneumonia, or phthisis, when the expectoration may have the characteristic properties of those diseases ; the breathing is extremely anxious, frequent, and short ; the pain is increased by deep inspiration, or by the act of coughing ; it is also increased by lying upon the affected side ; frequent, hard, contracted pulse, vibrating under the finger like the tense string of a musical instrument ; white tongue, scanty, high-colored urine, hot skin, flushed cheeks, and other symptoms of synocha.

These are the symptoms of acute pleurisy, in their marked form and at the onset of the disease. Sometimes, however, severe and extensive inflammation of the pleura occurs without these well-marked characters. The pain may be more diffuse, less severe, or produced only by pressure between the ribs of the affected side ; and in some instances it is altogether absent. In most cases, the acute pain, as well as the fever, subside on the third or fourth day, and the cough and dyspnœa abate, though the pleura is still in a state of inflammation.

Terminations.—In resolution ; in adhesion ; in effusion ; in the chronic form.

ANATOMICAL CHARACTERS.—Injection of the subserous cellular membrane, with dryness of the surface of the pleura ; effusion of coagulable lymph, or of pus mixed with flakes of lymph ; and recent adhesions.

PHYSICAL SIGNS.—When the disease is recent, the effusion scanty, and the surfaces of the pleura not adherent, there are feeble respiratory murmur from diminished motion of the chest, dullness on striking the pleximeter lightly and quickly with the fingers, friction sounds accompanying the move-

ments of respiration, cessation of vocal fremitus, and ægophony. If adhesion takes place, the friction sounds cease, and if effusion occur to a considerable extent, the physical signs are those stated under Empyema. (See Empyema.)

CAUSES—Predisposing.—The general predisposing causes of inflammation.

Exciting.—Cold; external injuries, fractures of the ribs, &c.; febrile states of the system; inflammation of the adjoining textures; tubercles in the lung.

DIAGNOSIS.—From pleurodyne, by the presence of severe constitutional symptoms, and of the characteristic physical signs. (See Pleurodyne.) From other diseases of the chest, by physical signs.

PROGNOSIS—Favorable.—A recent attack met by prompt treatment; the absence of complications; if the disease is not recent, the absence of hectic, and of great debility.

Unfavorable.—Rapid and extensive effusion; the disease existing on both sides of the chest; the coexistence of organic disease; hectic fever and great debility; dropsical effusion.

TREATMENT.—In the acute form of the disease, the *indication* is to reduce the local inflammation and prevent effusion.

This indication is fulfilled by a full bleeding from the arm to the approach of syncope, and the entire relief of the pain and breathing, followed immediately by full doses (from a quarter to half a grain, or even more) of tartar-emetic, every two or three hours, brisk aperients, and a strict antiphlogistic diet. The bleeding will rarely require to be repeated, but if the symptoms indicate it, it should not be delayed. It is of little use after the first few days. For slighter degrees of inflammation, cupping and leeches may be prescribed. The tartar-emetic may be usefully combined with calomel. The tartar-emetic keeps up the effect of the bleeding, until the calomel, slightly affecting the system, entirely puts a stop to the inflammatory tendency.

CHRONIC PLEURISY.

SYMPTOMS.—Chronic pleurisy is a general consequence of the acute form, but it occasionally begins as a subacute or chronic disease. In either case, hectic or remittent fever, a permanently accelerated pulse, emaciation, dyspnœa increased by exertion, and inability to lie on the healthy side, are the principal symptoms. These are apt to alternate with symptoms of the more acute form, such as severe pain, and increased hardness of the pulse.

ANATOMICAL CHARACTERS.—Effusions of various kinds in the sac of the pleura; coagulable lymph thrown out on the surface

of the membrane, and in various stages of organization; recent adhesions.

TREATMENT—*Indications*.—I. To promote the absorption of the effused matter. II. To support the patient's strength.

I. The first indication may be fulfilled by mercury, carried to the extent of affecting the system, or by the continued administration of the hydriodate of potash, aided by such local measures of depletion or counter-irritation as may be necessary to prevent the re-establishment of inflammation. Cupping, or leeches, with blisters to the affected side, or the tartar-emetic ointment, will fulfill this indication.

II. The general strength may be supported by the cautious use of tonics, and in cases of great debility, or where the disease has supervened on fever or erysipelas, by the use of stimulants and a nourishing diet.

These measures will often lead to the absorption of the effused matter, but where this is very considerable, and especially when it consists chiefly or wholly of purulent matter, absorption rarely takes place, and the disease now takes the name of *empyema*.

Absorption can not take place without more or less affecting the shape of the chest, for in by far the majority of cases, and in all cases where the effusion has been very considerable, the lung is either permanently condensed by the pressure, or bound down by firm adhesions. As the fluid, then, is absorbed, the walls of the chest must fall in, and this shrinking of the diseased side may be ascertained by measurement. The depression first shows itself in the upper part of the chest, but as the absorption proceeds, extends to the whole of the affected side. The shoulder falls, and remains more fixed than that of the sound side, the ribs are closer together, the scapula approaches the spine and is more prominent, the spine itself is often concave toward the same side; the contents of the abdomen, too, are pressed up into the affected side, while the lung of the sound side, expanding beyond its usual limits, displaces the mediastinum and the heart. These changes are accompanied by appropriate physical signs of condensed lung, dullness on percussion, impaired respiratory murmur, bronchophony, vocal fremitus. When the effusion is partial and confined by adhesions, the contraction will also be partial, and the physical signs more limited in their extent. Pleurisy may occur in young people, and lead to great deformity, without much impeding the function of respiration; but when it attacks the adult, it generally leaves behind it some dyspnoea, with a strong tendency to a recurrence of the disease.

EMPYEMA.

This term is applied to a collection of pus in the cavity of the pleura, but the meaning may be extended, without impropriety, to any collection of fluid, the result of previous inflammation of the pleura. The general symptoms are those of chronic pleurisy; and the physical signs those of effusion of liquid, whatever may be its nature. When the effusion is purulent, ulceration is apt to occur in some of the surrounding textures, and an opening is formed into the lungs, through the walls of the chest, or through the diaphragm. The bones may also become carious in consequence of the pressure to which they are subject. When the matter points externally, fluctuation is perceived in the part, and the integument becomes tense during expiration. When an opening takes place into the lungs, a large quantity of matter is discharged during a fit of coughing, and this is followed by great relief to the respiration. If the opening takes place externally, the discharge of matter is increased by strong expiration, as in coughing. It is often advisable to anticipate nature in affording this relief by resorting to an operation.

PHYSICAL SIGNS.—Enlargement of the diseased side, proportioned to the extent of the effusion, the ribs raised as in a deep inspiration; the intercostal spaces protruded, so as to be on a level with the ribs; sometimes perceptible fluctuation in the intercostal spaces; when the effusion is very considerable, universal dullness on percussion in all postures, with absence of respiratory murmur; when in less quantity, the dullness on percussion, and the respiratory and vocal sounds shifting with the position of the body, and the consequent pressure to which the lungs are exposed. In extreme cases, the heart is displaced so as to beat on the right side. Puerile respiration on the sound side, proportioned in intensity to the degree of compression on the lung of the diseased side. When the effusion is not very considerable, ægophony, which is generally most distinctly heard about the angle of the scapula.

PARACENTESIS THORACIS.—This operation must be performed with care and due precaution. It should not be delayed too long, as the structure of the lung will, in that case, become so condensed as not to admit of expansion during respiration. If the matter should point in any part of the chest, that part should be preferred for the opening; but if not, the trocar should be introduced somewhere between the third and seventh ribs, and at the side where the intercostal spaces are widest. The grooved needle should be first introduced, and if there is evidence of fluid in the pleura, the trocar should be cautiously inserted, the skin having been previously drawn upward,

so that the external and internal opening may not correspond. The object is to avoid the introduction of air during the operation; to insure this more effectually, it has been recommended to introduce the trocar under water. The matter must not be withdrawn all at once, but by repeated operations. Pressure by means of a bandage may be advantageously employed both during and after the operation. For more minute details, consult works on surgery.

PNEUMOTHORAX.

Air may find its way into the cavity of the pleura in two ways: 1. By communication with the external air, through an opening into the lungs, or through the parietes of the chest. 2. By secretion. The first is the more common cause.

SYMPTOMS.—These vary with the direction in which the opening takes place, and with the previous condition of the pleura. When, in consequence of superficial ulceration of the lung, an opening takes place into a previously healthy pleural sac, the entrance of air gives rise to dyspnoea, acute pain, dry cough, spasms of the intercostal muscles, a frequent, feeble, and sometimes irregular pulse. These symptoms, which take place more or less suddenly, according to the size of the opening, are soon followed by those of inflammation of the pleura. When inflammation already exists, the presence of air not only tends to increase it, but converts the otherwise inodorous pus into a highly offensive discharge.

PHYSICAL SIGNS.—Unusually clear, tympanitic sound on percussion, with great indistinctness or total absence of respiratory murmur on the affected side, with increased distinctness of the respiratory murmur on the sound side; and *metallic tinkling*, or *amphoric resonance*. When there is liquid as well as air in the sac of the pleura, the physical signs are, dullness on percussion as high as the level of the fluid, that level shifting with change of posture; metallic *ringing* heard after change of position and coughing; and *succussion* on sudden motion.

PROGNOSIS.—Generally unfavorable. In some instances life is prolonged for many months.

TREATMENT.—This depends upon the stage of the disease and the state of the patient. The sudden rupture of the lung is generally followed by symptoms of collapse and irritation, which may require stimulants and opium; when inflammatory symptoms come on, antiphlogistic measures must be prescribed, proportioned to the severity of the symptoms and the patient's strength. General blood-letting will rarely be ad-

missible ; we must, therefore, resort to local depletion by cupping or leeches, and counter-irritation. Tartar-emetic may be given in nauseating doses, and the bowels should be kept free by gentle aperients. When extreme dyspnœa is present, an opening must be made to give exit to the air, and this should be done at a part of the chest below the level of any liquid which it may contain. The operation may be repeated if necessary.

HYDROTHORAX.

This term is used to designate an effusion of *serum* into the sac of the pleura, empyema being employed to distinguish effusions approaching in consistence to the character of pus and the result of pleuritis.

SYMPTOMS.—In most cases the first symptom which shows itself is œdema of the lower eyelids, followed by swelling of the feet and ankles. This is soon followed by dyspnœa, increased upon exertion ; and most considerable during the night, when the body is in the horizontal posture ; distressing sense of weight and oppression at the chest ; the countenance is pale ; sometimes, however, it has the asthmatic purple tinge, and wears a peculiar and striking expression of anxiety ; the urine is in small quantity ; great thirst ; anasarca of the upper extremities ; the pulse is irregular, often intermitting for two, sometimes for three strokes ; palpitation of the heart, sometimes so great as to be both seen and heard ; cough, with expectoration generally tinged with blood ; in describing his complaint, the patient frequently mentions his having the sensation of breathing through water ; difficulty of lying upon one side ; and when the disease exists in both cavities of the chest, the patient is incapable of lying down at all, and is obliged to be supported by pillows in an erect position ; his sleep is disturbed by dreadful dreams of fire, of drowning, of falling down precipices, &c. ; and frequently he awakes with a sense of suffocation, sudden starts from his bed, rushes to the open window for air, and is some time before he recovers his recollection ; the arm of the side in which the water is collected is generally cold and torpid, and often affected with numbness.

PHYSICAL SIGNS.—For these, see Empyema.

CAUSES.—Organic disease of the heart, extensive chronic disease of the lungs, causing a mechanical impediment to the circulation of the blood. The disease is probably never idiopathic ; when inflammation of the pleura exists, it leads to the effusion, not of pure serum, but of mixtures of serum and coagulable lymph, or of pus.

PROGNOSIS.—Very unfavorable, as it indicates increasing

severity of the organic disease which has given rise to it, and is in itself a formidable complication.

TREATMENT—*Indications*.—I. To reduce any existing inflammation. II. To promote the absorption of the effused fluid.

The first indication may be fulfilled by local depletion, by cupping or leeches, by counter-irritants, and by small doses of tartar-emetic. The second indication requires hydragogue cathartics, as the compound jalap powder, or elaterium; or diuretics, as digitalis, squills, acetate of potash, spiritus ætheris nitrici, infusum scopariæ, &c. The choice of the remedies must depend upon the patient's strength and state of health. If great debility is present, diuretics are preferable to drastic purgatives, and if the debility be extreme, the stimulant diuretics should be preferred. An operation is less likely to be attended with benefit in cases of hydrothorax than in those of empyema, but it may be resorted to when the urgency of the symptoms requires it.

CHAPTER IV.

DISEASES OF THE PRIMÆ ViÆ, ORGANS OF DIGESTION, AND CHYLOPOIETIC VISCERA.

1. Diseases of the Mouth and Fauces.
2. Diseases of the Stomach.
3. Diseases of the Intestines.
4. Diseases of the Stomach and Intestines.
5. Diseases of the Liver, Pancreas, and Spleen.
6. Diseases of the Peritoneum.

DISEASES OF THE MOUTH, FAUCES, &c.

STOMATITIS	Inflammation of the Mouth.
GENGIVITIS	Inflammation of the Gums.
GLOSSITIS	Inflammation of the Tongue.
TONSILLITIS	Inflammation of the Tonsils.
PAROTITIS	Inflammation of the Parotid Gland.
CYNANCHE THYROIDEA . .	Bronchocele.

STOMATITIS—INFLAMMATION OF THE MOUTH.

SPECIES.—1. Stomatitis erythematosa; 2. Stomatitis membranosa; 3. Stomatitis folliculosa (aphthæ); 4. Stomatitis ulcerosa; 5. Stomatitis mercurialis; 6. Stomatitis gangrenosa.

ERYTHEMATOUS STOMATITIS.

SYMPTOMS.—The congested state of the lining membrane of the mouth in new-born infants disposes it to become the seat of erythematous stomatitis, which is generally character-

ized by redness and heat, and sometimes by dryness of the mouth and tongue. It often coexists with inflammation of the stomach and bowels, and is rarely accompanied by fever in very young infants, though this symptom is common to infants from the seventh to the ninth month. This inflammation may be confined to a part, or extend to the whole mouth, and even to the lips, which swell, excoriate, and sometimes become the seat of *herpes labialis*. When the disease persists for a long time, it often causes profuse salivation, especially in infants under the seventh month.

TREATMENT.—Simple erythematous stomatitis readily yields to emollient applications to the mouth and a milk diet; and, when it is complicated with inflammation of the stomach and bowels (gastro-enteritis), it yields to the remedies which remove that inflammation.

STOMATITIS MEMBRANOSA—MEMBRANOUS STOMATITIS—MILLET.

SYMPTOMS.—This disease is sometimes confounded with aphthæ, though very easily distinguished from them. The false membrane presents itself in three different forms: 1. As small white points spread over the tongue and inside of the mouth; 2. In the form of larger or smaller patches; 3. In the form of a membrane, which covers the entire tongue and inside of the mouth. Sometimes the points or patches are yellow or reddish, which color is caused by the contact of bile or a sanguineous exhalation from the mucous membrane affected.

When the inflammation of the mouth subsides, the secretion which accompanies it is suspended, and the false membranes are absorbed and disappear. But the inflammation very often advances, the white spots unite and form a large patch, either on the surface of the tongue, lips, or cheeks, or they cover the whole lining of the mouth. These patches thicken, exfoliate, or detach themselves, leaving an inflamed surface beneath.

The disease is most common to infants; it may extend along the whole alimentary canal from the mouth to the anus, and also into the lungs and along all the mucous membranes. The mucus is more tenacious or adhesive than usual, similar to what we observe in chronic bronchitis, or winter cough of aged persons. Infants at the breast are more subject to it than those of a more advanced age. Perhaps there is something in the constitution of very young infants which predisposes them to this modification of inflammation. It is most common to delicate infants who are crowded in the same place, and to those who are improperly fed with artificial food, or deteriorated breast-milk. The disease is more frequent in France than in England, and prevails, more or less, at all seasons. The disease is sometimes seen in adults.

SYMPTOMS.—When the disease is mild or partial, there is scarcely any constitutional disturbance; but in the severe forms, there is hot and dry skin, urgent thirst, frequent pulse, and other symptoms of fever. This is particularly the case when the disease extends to the stomach and bowels; or along the mucous membrane of the windpipe to the lungs. When the palate, tonsils, larynx, and trachea are affected, the voice is hoarse, and the cry dull.

CAUSES.—*Predisposing.*—Early infancy; debility.

Exciting.—The congregation of a great number of infants in the same place.

The disease does not appear to be contagious, as MM. Baron and Billard have frequently observed healthy infants drinking from the same cup as the diseased, without contracting the disease.

TREATMENT.—When the disease is simple, distinct, or benign, the mouth should be washed frequently in the day with a piece of lint wetted with gum-water; or with a mucilaginous decoction, containing a fourth part of Labarraque's solution of the chloride of lime. In more severe cases, alum or zinc gargles, sweetened with sirup, should be prescribed. The bowels must at the same time be regulated by mercurial purgatives. If the disease extend to the bowels, and diarrhœa is present, a strict regulation of the diet, according to the age of the patient, with small doses of the pulvis cretæ c. c. opio, should be prescribed.

STOMATITIS FOLLICULOSA—APHTHÆ—THRUSH.

SPECIES.—1. *Aphtha infantum*; 2. *Aphtha adutorum*.

SYMPTOMS.—An eruption of small white specks, single or confluent, appearing on the tongue, lips, cheeks, gums, uvula, palate, and tonsils. They usually soften in the center, and discharge a glutinous mucus, which forms a thick whitish crust, adhering at first most tenaciously, and at length falling off without inducing an eschar on the parts beneath. In some cases, the lining membrane of the mouth and throat, and the surface of the tongue, become covered with patches of a loose ragged membrane, hanging from these parts, and of a dull white, grayish, or reddish color. There is in some cases difficulty of mastication, deglutition, and respiration; and the disease may extend to the œsophagus and stomach, and throughout the whole alimentary canal, in which case mucus is evacuated in large quantities by vomiting and stool; and at other times to the trachea and bronchi, when mucus is expelled by coughing. Aphthæ often fall off in the space of ten or twelve hours; more generally they remain for many days, and frequently a separation and reproduction take place sev-

eral times before the termination of the disease. In severe cases the ulcers assume a livid color, and become gangrenous ; in others, the surface of the membrane between the ulcers is of a bright red color. The disease is most common to children in early infancy, though it may appear at any subsequent period of life. It was formerly considered endemic, and sometimes contagious.

At the commencement of the disease, the infant experiences a disinclination to the breast, and is fretful whenever it is applied. Its appetite is bad, and its motions are depraved, though in some cases there is scarcely any indisposition. In others, there is much feverishness and irritability, the mouth becomes hot and tender, the nipples of the nurse become painful, and sometimes excoriated or chapped, from the contact of the infant's mouth. The disease is slight when confined to the mouth ; but when it extends to the œsophagus, stomach, and bowels, there will be frequent vomiting and diarrhœa, followed by irritation and excoriation of the rectum and anus, which become covered with spots like those in the mouth.

Aphthæ sometimes terminate in gangrene, when their edges assume a burned, torn, and soft appearance ; they present a brown eschar, which, when detached, leaves an open granulating surface, of a vermilion color. The eschar is sometimes covered with a soft pultaceous substance, of a brown color, and has a marked gangrenous odor. The surrounding parts become swollen, are of a violet color, and are soft and easily depressed. The mouth of the infant, which is generally open, allows the escape of the saliva ; the face is pale ; there is great prostration of the vital powers, and an absence of fever. The pulse is extremely feeble ; the skin is cold, pale, and insensible. After some time, vomiting, diarrhœa, tumefaction of the abdomen, and sometimes hiccough, supervene.

CAUSES—*Predisposing*.—The period of early infancy ; the lymphatic temperament ; debility.

Exciting.—Impure air, improper food, disordered bowels, and irritation of the mouth itself.

TREATMENT—*Indications*.—I. To moderate or remove the inflammation, to produce a separation of the aphthæ, and to heal the superficial ulcers. II. To improve the general health.

I. The first indication will be accomplished by frequently washing the mouth with lint or soft sponge, firmly tied to a small piece of wood or whalebone, and dipped in warm water, milk and water, decoction of marsh mallows, linseed, or barley, or by any other mild mucilaginous fluid ; and also by applying the vapor of such decoctions, or of warm water, to the interior of the mouth.

When the aphthæ remain stationary, and are surrounded by

strongly marked inflammatory circles, it may be necessary to apply a leech to each cheek.

If, after the inflammation is subdued, the aphthæ remain adherent, stimulant applications must be used to detach them. A good application for this purpose is composed of one drachm of borax, one ounce of honey, and half a pint of water, and this should be gently and frequently employed in the manner already mentioned. Others prefer equal parts of honey of roses and barley-water, with a few drops of dilute sulphuric acid. It is often beneficial to touch the ulcerated surface with a fragment of alum, with a view of exciting a new action in the parts, and to dispose the inflamed surfaces to cicatrize. If used with caution, it accomplishes the same result as borax and sulphate of zinc, which are much more stimulant. We may also employ a solution of chloride of lime or soda in a mucilaginous fluid: a drachm of the solution of either chloride may be mixed with a pint of barley-water, and sweetened.

II. The bowels are to be opened with manna, magnesia, or castor oil, and small doses of the hyd. c. cretâ. The diet must be that appropriate to the age of the child, and the nursery must be properly ventilated. The warm bath may be used with great advantage when the child is feverish and restless. Opiates, if administered, should be given with great caution and in small doses. In chronic cases, change of air is highly beneficial.

Gangrene consequent on aphthæ is extremely fatal, as it is accompanied by great prostration of strength. The indications of *treatment* are to support the strength and correct the state of the affected parts. The first indication is fulfilled by aromatic spirit of ammonia, wine, quinine, animal and vegetable jellies; the second by touching the gangrenous part with a solution of chloride of lime or soda, or with sulphuric, nitric, or muriatic acid, by means of a capillary glass tube. A mucilaginous fluid, acidulated with some of the chlorides or acids just mentioned, may be applied to the gangrenous parts of the mouth with a fragment of soft sponge, or lint tied on a piece of wood or whalebone. Some advise the application of a solution of alum, others prefer the nitrate of silver, or the fused potass.

The aphthæ of the adult is of most common occurrence in advanced stages of pulmonary consumption, and is very rarely an idiopathic disease. The treatment required consists in the exhibition of alteratives and strict attention to the state of the bowels, with gargles containing the mineral acids, alum, myrrh, or common salt. If these are ineffectual, nitrate of silver or sulphate of copper may be applied in substance.

STOMATITIS ULCEROSA—ULCEROUS INFLAMMATION OF THE MOUTH.

SYMPTOMS.—Inflammation of the gum and jaws, of one or both sides, accompanied with swelling, and followed by ulceration at the margin of the teeth; swelling and tension of the cheeks; salivation; fetor of the breath; redness and heat of the face; injection of the conjunctiva; painful enlargement of the submaxillary glands. The local affection is accompanied by disturbance of the general health, fever, anorexia, and constipation. The ulcers are generally indolent, but occasionally spread till they lay bare the jaw.

CAUSES.—*Predisposing.*—The period between the first and second dentitions; all causes of debility. *Exciting.*—Disorder of the stomach and bowels; cold.

PROGNOSIS.—*Favorable* when the disease is idiopathic. If it follow on fever or scarlatina, *unfavorable*, according to the severity of the primary disease.

TREATMENT.—I. Local; II. General.

I. The local treatment consists in the use of diluted acids, or of strong solutions of alum, zinc, or nitrate of silver. Tincture of myrrh may also be advantageously employed. In very severe cases, sulphate of copper or nitrate of silver in substance.

II. The constitutional treatment will consist in strict attention to the state of the bowels, the regulation of the diet, and the general health. Aperients, a bland farinaceous diet, and pure air, with quinine or ammonia, if rendered necessary by existing debility. The best aperient will consist of equal proportions of the pulv. rhei and hyd. c. creta, in doses proportioned to the age, followed by castor oil.

STOMATITIS MERCURIALIS—MERCURIAL SALIVATION.

SYMPTOMS.—A disagreeable coppery taste in the mouth, looseness of the teeth, and tenderness of the gums, a peculiar fetor of the breath, with shooting pains in the face, stiffness of the jaw, and swelling of the parotid and submaxillary glands. The gums are at first marked by a distinct red line, and then become generally red and swollen. The inflammation of the gums soon extends to the tongue, which is swollen, indented by the teeth, and furred, and to the interior of the cheeks; there is a constant and profuse discharge of saliva. These local symptoms are accompanied with some degree of fever and general irritation. The inflammation sometimes proceeds to ulceration of the gums and cheeks, and in rare cases to gangrene.

The duration of mercurial salivation, in slight cases, is two

or three days; in severe cases, ten days or a fortnight, and if ulceration or gangrene ensue, still longer. Several weeks often elapse before the gums are restored to their healthy state.

TREATMENT.—Gargles of alum, zinc, or chloride of sodium. In more severe cases, and when the gums are ulcerated, a strong solution of nitrate of silver (a drachm to an ounce and a half of distilled water), applied by means of a camel-hair brush, or nitrate of silver or sulphate of copper in substance. If much swelling of the glands is present, leeches to the jaws, followed by warm fomentations. If there is much irritation, opium may be given two or three times daily. Saline aperients and free ventilation complete the treatment.

STOMATITIS GANGRENOSA—GANGRENE OF THE MOUTH.

SYNONYMS.—*Gangrena oris*; *Cancrum oris*; *Water Canker*.

SYMPTOMS.—A circumscribed, indolent, hard swelling on one cheek, without pain, heat, or redness, and unaccompanied by fever, characterized by an oily or waxy appearance of the skin. An eschar forms on the lining membrane of the mouth, corresponding to this central spot, and gradually spreads till it involves the whole of the cheek, lips, and gums, and, in extreme cases, the periosteum, and even the bones of the face. A dirty, sanious fluid, of highly offensive odor, constantly flows from the mouth, and irritates the parts with which it comes in contact, causing them to inflame, and in their turn to slough. There is, throughout the disease, an absence of febrile symptoms, but the patient is weak, the extremities cold, the circulation languid, and the child at length dies exhausted.

CAUSES.—*Predisposing.*—Age from two to five years, and in rare cases a year or two later; insufficient nourishment; impure air; low, damp situations; and all the causes of debility and cachexia. *Exciting.*—Febrile diseases, and the exanthemata, of which it is sometimes a sequel.

DIAGNOSIS.—*Cancrum oris* is apt to be confounded with sloughing produced by mercury, and there is no diagnostic mark by which the two affections can be certainly distinguished. The history of the case may, however, serve to establish a strong probability. As a general rule, *cancrum oris* begins in the cheek, and mercurial gangrene in the gums, or lining membrane of the cheeks bordering upon the gums; but there are exceptions to both rules. In some cases, the difficulty of diagnosis is put an end to by the fact that no mercury has been given.

PROGNOSIS.—*Unfavorable.*—If the disease do not prove fatal, it generally leaves an unsightly scar.

TREATMENT.—Stimulating embrocations, as the linimentum

camphoræ compositum, or the linimentum ammoniæ to the cheek, and as soon as an eschar makes its appearance on the lining membrane of the cheek, the application of the lunar caustic, or strong muriatic or nitric acid. In the intervals of the application of the caustic or acid, the frequent use of a solution of chloride of soda, by means of a syringe, or a piece of lint or soft sponge attached to a stick.

A conical incision over the livid spot on the cheek and the actual cautery to the seat of the disease have been strongly recommended by MM. Baron and Billard.

The constitution should, at the same time, be supported by the use of beef tea, alone or thickened with arrow-root, by chicken-broth, and milk, with wine or brandy in quantities proportioned to the age and degree of debility. Quinine or ammonia should at the same time be administered in full doses; the patient should be kept clean, and be placed in an open, airy apartment. The state of the bowels should be carefully attended to; if constipation is present, the compound rhubarb or compound jalap powder should be given as often as necessary, and diarrhœa must be met by the usual remedies.

GINGIVITIS—INFLAMMATION OF THE GUMS—PAINFUL DENTITION.

Dentition or teething is a natural function, and in infants in perfect health unproductive of pain or disease. In general, however, infants suffer more or less severely during dentition from irritation in the stomach and bowels, often followed by diseases of the head and chest.

SYMPTOMS.—Dentition is generally accompanied by an increased flow of saliva, the gum is red, hot, painful, and swollen. The infant puts its fingers, or whatever it can grasp, into the mouth, and presses its gums upon it, which excites absorption and promotes the cutting of the teeth. Pressure, however, is not borne when true inflammation is present, in which case there is even a reluctance to take the nipple. In some cases there is intense inflammation of the gum, extending to the lining membrane of the mouth, and ulceration, followed by aphthæ, or gangrene.

The general symptoms are, feverishness, fretfulness, disturbed sleep, determination of blood to the head, often accompanied by diarrhœa and griping pains in the belly; and inflammation of the brain or its coverings. In extreme cases, water in the head, with convulsions, inflammation of the lungs, and laryngismus stridulus. Skin diseases are also of frequent occurrence, of which the most common are strophulus and lichen.

The *treatment* of the local complaints of the first dentition consists, in mild cases, of gentle friction of the gums; in more

severe cases, of scarifications of the gums. The use of the warm bath, the proper regulation of the diet, and a strict attention to the state of the bowels, complete the treatment of mild cases. The diseases which supervene on teething must be treated on the same principles as the idiopathic affections.

Incision of the gums ought not to be practiced unless they are swollen, hot, and painful, in consequence of the pressure of the teeth. When the incision is made prematurely, the appearance of the tooth, so far from being accelerated, is retarded.

The mode of incising the gum deserves attention. The head of the infant is to be held, while the operator opens the mouth and separates the jaws. He then introduces a bistoury, three fourths of whose edge is covered with lint, and makes an incision parallel to the alveolar margin; and then, separating the jaws still more, he makes another incision transverse to the first. These incisions should be made down to the tooth; the gum ought to be completely divided, and no flap or bridle allowed to remain. This crucial incision discharges the congestion or inflammation of the gum, and removes the irritation caused by the pressure of the hard tooth on the irritated nerves of the gum. This operation is by no means so painful as is generally imagined. Several local applications to the gums have been recommended, but it is doubtful whether any benefit is derived from their use.

The gums are subject to swelling, ulceration, and gangrene, both in the infant and in the adult. When these affections occur in the adult, they are generally parts of other more general diseases of the system, as scurvy, or mercurial salivation; in young children, they are more commonly idiopathic.

GLOSSITIS—INFLAMMATION OF THE TONGUE.

SYMPTOMS.—Inflammation of the whole tongue is a rare disease, except as the consequence of profuse salivation, or the application of strong irritants. More commonly it is of limited extent, appearing at first as a hard tumor on the upper surface. This tumor suppurates slowly, and leaves a deep ulcer, which sometimes penetrates the tongue. It owes its origin, in most instances, to derangement of the stomach and bowels, and is cured by purgatives, with the local application of nitrate of silver.

Inflammation of the whole tongue is often a severe and dangerous disease, characterized by heat, swelling, and pain, difficult speech and deglutition, dyspnoea, salivation, swelling of the veins of the neck, and determination of blood to the head, with the familiar symptoms of inflammatory fever.

TERMINATIONS.—In resolution, suppuration, or gangrene. In extreme cases it threatens suffocation or apoplexy.

CAUSES.—Mechanical injuries; strong irritants; the sting of insects; salivation; extension of diseases affecting the tonsils, gums, cheeks, &c.

TREATMENT.—In the early stage, general and local depletion, according to the severity of the symptoms, with brisk purgatives and other antiphlogistic remedies, and ice to the surface of the tongue. In a more advanced stage, free incisions. When these remedies fail, and suffocation is threatened, tracheotomy must be performed.

Ulceration sometimes takes place on the side of the tongue from the irritation of a decayed tooth. In this case the cause of irritation must be removed by filing or removing the tooth.

Scirrhus of the tongue is known by the peculiar hardness of the tumor, the irregular ulceration, the acute lancinating pain, and the cachectic state of the constitution.

Syphilitic ulcerations of the tongue, occupying chiefly its edges, occasionally occur, and require a course of mercury or iodide of potassium, with the local application of nitrate of silver.

TONSILLITIS—INFLAMMATION OF THE TONSILS.

SPECIES.—1. Acute; 2. Chronic.

ACUTE TONSILLITIS—CYNANCHE TONSILLARIS—QUINSY— INFLAMMATORY SORE THROAT.

SYMPTOMS.—After rigors, followed by flushes of heat, and pains in the back and limbs, and a full, frequent, and compressible pulse, a sense of fullness, heat, and dryness in the throat, pain and difficulty in swallowing, and hoarseness of the voice. The throat itself presents a diffused redness, of a deeper color over the tonsils, which are swollen, and covered with a viscid mucus; and the tongue is coated with a white creamy fur. As the disease advances, the swelling of the tonsils increases; the act of swallowing becomes more painful and more difficult; liquids return through the nostrils, and there is a constant discharge of viscid saliva; the hoarseness of the voice and the impediment of the speech increase, the respiration is affected, and there is a painful sense of tension, with acute darting pains in the ear. The febrile symptoms increase in severity with the enlargement of the tonsils, and the pain in the back and limbs becomes more acute; but in a more advanced stage of the disease, the febrile symptoms often subside, or they change their character from those of inflammatory fever during the first stage, to those of mild hectic during the stage of suppuration.

Duration from five to seven days.

TERMINATIONS.—By resolution, suppuration, ulceration, or gangrene; or in chronic enlargement.

Each of these terminations is characterized by peculiar symptoms. Thus, we presume that resolution will take place when the disease is slight, when the respiration is not much impeded, when the act of swallowing is neither very difficult nor very painful, and when, on examination, the tonsils are not found highly inflamed or much enlarged. Suppuration is to be feared when the disease is prolonged and does not yield to remedies, when the local pain is acute and throbbing, or when there are rigors or cold shiverings without any evident cause. An abscess is indicated when there is much swelling, a sense of fluctuation on pressure made with the finger, a whiteness of some part of the tumor, and, finally, purulent expectoration. Gangrene is to be dreaded if the fever is intense and the pain extremely violent, without any sign of resolution, suppuration, or metastasis. A pinched and sunken countenance; the extremities cold and covered with a clammy perspiration; a small, frequent, weak, and intermittent pulse; and a fetid odor issuing from the mouth, are signs of its existence.

CAUSES—*Predisposing*.—Childhood, youth, and middle age: it rarely occurs after forty years of age; previous attacks. *Exciting*.—Cold; cold drinks while the body is heated or in a state of perspiration; the deglutition of acrid or stimulating substances; long and loud crying, or singing. Patients who have once suffered from it are very liable to its recurrence on any exposure to cold.

TREATMENT.—The treatment of acute tonsillitis must be more or less active, according to the severity of the symptoms. When the disease is slight, little medicine is required. A moderate diet, a mild aperient, confinement to bed, with warm drinks, are generally sufficient to effect a cure.

When the disease is more severe, it may be necessary at the onset to apply leeches to the throat, to administer brisk aperients, to give nauseating doses of tartar-emetic, and to allow the patient to drink freely of iced water, or to swallow rough ice. When, however, the disease has made some progress, and suppuration has commenced, the cold water or ice should be omitted; warm poultices should be applied externally, the patient should be directed to inhale the steam of hot water, and to use emollient gargles, and the abscess should be allowed to discharge itself.

If the respiration is much impeded, from the great enlargement of the tonsils, emetics will sometimes cause the abscess to burst, or it may be opened by a lancet or bistoury. In the

majority of cases, the tumors subside of themselves, or the abscess discharges itself without requiring any interference.

REMEDIES.—Stimulant applications to the throat? Pulvis Guaiaci given in doses of ʒss. every six hours, at the onset of the attack.

CHRONIC TONSILLITIS.

Chronic enlargement and induration of the tonsils often follows an acute attack of tonsillitis. It is also of frequent occurrence in cachetic constitutions, and in the chronic forms of dyspepsia. Sometimes, also, it is prevalent during epidemics of scarlatina. The disease is generally removed by improving the general health. When, however, it does not yield to constitutional remedies, and is of such a size as to impede deglutition or respiration, or to affect the voice, excision may be practiced with advantage. The same remedy is recommended in chronic relaxation of the uvula. The ointment or tincture of iodide may also be applied externally with benefit.

Ulceration of the tonsils may likewise occur in disordered states of health, but it is more commonly one of the secondary effects of syphilis. The disease is generally slow in its progress, but, if not speedily removed, attacks the surrounding textures, extending into the nostrils and fauces, and ultimately attacking the larynx itself.

Syphilitic ulceration of the tonsils is effectually treated by the iodide of potassium given in five-grain doses three or four times a day. This is to be preferred to the preparations of mercury which were formerly in use. A gargle of the chloride of sodium may, at the same time, be used with much advantage, and the ulcers may be frequently touched with nitrate of silver. The general health must be carefully attended to, and the strength must be supported by a nourishing and generous diet. The decoction of sarsaparilla is generally given at the same time with the iodide of potassium.

If the ulcers should continue to spread under the use of the iodide of potassium, a course of mercury may be substituted.

PAROTITIS—CYNANCHE PAROTIDEA—THE MUMPS.

SYMPTOMS.—After slight febrile symptoms, fullness and soreness at the angle of the jaw, with pain on moving the part. The swelling extends by degrees upward to the space between the cheek and ear, and downward to the sub-maxillary gland. On the fourth day it begins to subside. The disease is sometimes accompanied toward its decline, or it is followed, by painful swelling of the breasts or testicles. It generally terminates in resolution.

CAUSES.—Contagion; exposure to cold; scarlatina, and other febrile diseases.

TREATMENT.—The application of flannel, friction with stimulating liniments, gentle aperients, farinaceous diet. If much inflammation is present, leeches may be applied. The secondary affection of the breasts or testicles must be treated in the same way.

Sometimes a metastasis of the inflammation takes place to the brain. In this case, the treatment will be that of idiopathic affections of the brain.

CYNANCHE THYROIDEA—BRONCHOCELE—GOITRE.

SYMPTOMS.—A swelling affecting the entire thyroid gland, or a single lobe of it; at first firm and elastic, but after a time soft, flabby, and containing small portions of a denser consistence. It grows slowly at first, but after a time increases rapidly, extending in all directions, upward toward the jaw, laterally beyond the limits of the neck, and frequently hanging over the chest. It sometimes attains an enormous size, in which case it may cause serious inconvenience by its pressure on surrounding parts, on the trachea, and on the vessels of the neck.

ANATOMICAL CHARACTERS.—The gland is found surrounded with a large quantity of condensed cellular membrane; the gland itself is hypertrophied either partially or through its whole extent, and presents, when cut into, a congeries of cells, varying in size from that of a pea to considerable cavities. These cells contain fluids of various character and consistence.

CAUSES—*Predisposing*.—Female sex; the age of puberty; hereditary tendency. *Exciting*.—Unknown. The disease is endemic in localities differing widely from each other in all respects; combined with idiocy or imbecility, it is the *cretinism* of the Vallais.

TREATMENT.—Iodine in the form of ointment or tincture externally. The iodide of potassium internally. In plethoric subjects, or where there is local inflammation, the previous use of depletion, general or local. Benefit is often derived from the application of leeches. Removal from the district in which the disease originated.

When all other means have failed, and the tumor, by its pressure, occasions great inconvenience, various operations have been recommended. Some have employed setons with benefit. The thyroid arteries have been tied with temporary advantage. The tumor also has been extracted, but the operation is attended with alarming hæmorrhage, and has been followed by fatal consequences.

DISEASES OF THE OESOPHAGUS.

The gullet is subject to functional and structural diseases, among the former of which may be mentioned common inflammation, rheumatism, and spasmodic stricture ; among the latter, hypertrophy of the submucous tissue, and various malignant degenerations, such as scirrhus and medullary sarcoma. It may also become subject to pressure from aneurism of the aorta or carotid artery, from enlargement of the cervical glands, and from diseases of the spinal column.

Rheumatism of the gullet is a rare disease, characterized by painful deglutition distinctly referred to some part of its course, accompanied by rheumatism of other muscles, and yielding to the treatment proper to muscular rheumatism.

Inflammation of the gullet is the immediate effect of stimulating applications to the tube itself, such as hot water, and the several corrosive poisons. It may also arise from the extension of inflammation from the mouth, fauces, or tonsils. The appropriate treatment is the frequent use of ice or iced water.

Spasmodic stricture of the gullet is characterized by difficulty of swallowing, accompanied by a sense of choking in the throat, the food either passing into the stomach after many efforts to swallow, or being rejected. It is generally associated with other symptoms of hysteria, and is amenable to the treatment proper to that disease. It is distinguished from organic stricture by the circumstance of its not being constant, but subject to intermissions ; by the result of an examination with a bougie ; by the history of the case ; and the presence of other hysterical symptoms. It requires no local treatment, but, in obstinate cases, the daily introduction of a bougie may be attended with benefit.

DISEASES OF THE STOMACH.

GASTRITIS	Inflammation of the Stomach.
DYSPEPSIA	Indigestion.
GASTRALGIA	Pain in the Stomach.
PYROSIS	Water-Brash.
HÆMATEMESIS	Vomiting of Blood.
CARCINOMA OF THE STOMACH.	
PERFORATION OF THE STOMACH.	

GASTRITIS—INFLAMMATION OF THE STOMACH.

SPECIES.—1. Acute; 2. Subacute.

ACUTE GASTRITIS.

SYMPTOMS.—An acute fixed pain and sense of burning heat in the pit of the stomach, increased by pressure, deglutition, and the movements of respiration; frequent vomiting, attended with an increase of pain; hiccough; sudden and great prostration of strength; a hard, wiry, and rapid pulse, which soon becomes small, irregular, and intermittent; great restlessness; and extreme anxiety; intense thirst, and desire for cold drinks; the tongue red at its point and margins, or over its entire surface, and finally becoming parched and glazed.

The disease is rarely confined to the stomach, but extends to the gullet and intestines, being accompanied by pain and difficulty in swallowing, diarrhœa, and extreme tenderness of the abdomen.

TERMINATIONS.—*In resolution*, when the pulse becomes more soft and full, and the other symptoms gradually disappear. *In chronic gastritis*: *In gangrene*, marked by a violent exacerbation of the symptoms, followed by a sudden cessation of pain; a rapid and intermitting pulse; the utmost prostration of strength; cold extremities; delirium; hiccough; death. *In ulceration followed by perforation*, characterized by sudden and acute pain, with extreme prostration, followed by the symptoms of peritonitis.

CAUSES.—Drinking cold fluids while the body is heated; drinking hot water; acrid or poisonous substances taken into the stomach. Acute gastritis is, in a very large proportion of cases, the immediate effect of irritant poisons. Idiopathic inflammation almost invariably assumes the form of subacute gastritis.

DIAGNOSIS.—*From Enteritis*, by the seat of the pain, as ascertained by pressure; by the peculiar sense of burning heat in the epigastric region; by the more severe vomiting and hiccough.

PROGNOSIS—*Favorable*.—The pulse becoming more soft and full, and diminishing in frequency; the pain and tenderness gradually ceasing.

Unfavorable.—The continuance of the disease without any marked alleviation of symptoms. Extreme and general tenderness of the abdomen. Symptoms marking the accession of gangrene, or the occurrence of perforation.

ANATOMICAL CHARACTERS.—The mucous membrane of the stomach universally red, or covered with patches of inflammation, especially around the cardia and pylorus; abrasion, ulceration, or softening of the membrane; dark patches resembling gangrene, but arising from the effusion of blood into the substance of the membrane itself.

Occasionally the redness follows the course of the blood-vessels, which are injected and arborescent; the color is of a vivid red or black, as if charred. Gangrene is rarely met with; ulceration is also unusual, and seldom penetrates as far as the muscular coat. Softening is a common consequence. When contraction of the stomach accompanies inflammation, the rugæ of the mucous coat are very prominent, and of a deeper tint than the surrounding parts.

TREATMENT—*Indications*.—To reduce the inflammatory action, and diminish the irritability of the stomach.

1. By general and topical blood-letting.
2. By iced water or ice, externally and internally.
3. By keeping the bowels open, in the absence of diarrhœa, with emollient clysters.
4. By the free and frequent use of mucilaginous diluents, such as gruel, linseed tea, or barley-water, in which gum acacia is dissolved.

The sickness, restlessness, and pain may be relieved by small doses of morphia or hydrocyanic acid.

SUBACUTE GASTRITIS.

SYMPTOMS.—Pain in the epigastrium increased by pressure, and *immediately* on taking food, with constant nausea or sickness, the stomach rejecting food *as soon as* it is swallowed, or after a short interval. The tongue is sometimes red at the tip and edges, and furred in the center; at others, morbidly red over the entire surface; but in many cases perfectly clean. The bowels are generally costive, but sometimes diarrhœa is present, when the disease is called gastro-enteritis. The disease is often accompanied by a dry cough.

CAUSES.—Constipation; an occasional increase of dyspepsia; unwholesome diet.

TREATMENT.—A few leeches to the epigastrium in the more severe cases, followed by a blister or mustard poultice. In

the less severe forms of the disease, the counter-irritant alone is required. The diet must be carefully restricted to gruel, arrow-root, or sago, made with water or milk, to the entire exclusion of solid food. A mucilaginous mixture, with a few drops of tincture of hyoscyamus, may be given three times a day; and the bowels must be kept open by the compound rhubarb or aloetic pill, given every night, or every alternate night, as required.

DYSPEPSIA—INDIGESTION.

SYMPTOMS.—Want of appetite; nausea; flatulence; and eructations; heartburn; occasional pain in the epigastrium; a sense of fullness and oppression after eating, or a feeling of languor and depression relieved by taking food. A furred tongue; languor and aversion to exercise of mind or body; dejection of spirits. The foregoing symptoms, variously combined, and generally accompanied by some disorder in the functions of the bowels, in the form of constipation, diarrhœa, or the two conditions alternately, and with more or less derangement in the functions of the liver, constitute the most common form of dyspepsia. Obstinate vomiting; cold extremities; headache; vertigo; various affections of the senses, as dimness of vision, imperfect or double vision, bright spots before the eyes, or *muscæ volitantes*, and noises in the ears; palpitation; irregular or intermittent pulse; shooting or fixed pains in the region of the heart, and under the scapulæ, varying with the degree of flatulence, are occasional symptoms of dyspepsia; to which may be added, gastralgia and pyrosis. (See those diseases.)

CAUSES.—Debility; want of exercise; want of cleanliness; depressing passions; overloading the stomach with food; imperfect mastication; food difficult of digestion; liquids in excess, especially warm drinks, as tea and coffee; the abuse of spirituous liquors, opium, and tobacco; the frequent use of drastic purgatives; too short or too long an interval between meals; exercise immediately after taking food; diseases of the liver, pancreas, or spleen; the gouty diathesis; tubercular deposits in the lungs. It is a frequent precursor of pulmonary consumption.

DIAGNOSIS.—From *subacute Dyspepsia*, by the pain, if any, not following immediately or within a short interval of taking food, and by the absence of pain on pressure over the pit of the stomach.

PROGNOSIS.—*Favorable* in recent cases; *unfavorable* in proportion to the time that it has lasted. It is not in itself a fatal disease.

TREATMENT—*Indications.*—I. To correct any bad habits into

which the patient may have fallen, and to regulate the diet. II. To restore the tone of the stomach. III. To palliate urgent symptoms.

I. The first and most important step to be taken in the cure of dyspepsia is to point out to the patient the indispensable necessity of changing such habits and pursuits as may have tended to give rise to the disease, and continue to aggravate it: until this has been effected, remedies will be of no avail.

The habits which are most likely to require correction are the following: Eating too much at one time; eating too often or too seldom; taking too great a variety of food at the same meal; drinking too much liquid before or with the meals; imperfect mastication of food; the habit of resuming bodily or mental occupation directly after eating; indolent and sedentary habits; the neglect of personal cleanliness (daily ablution of the body with cold water or the shower bath, followed by friction with a rough towel, or the flesh brush, or hair gloves, should be particularly insisted on); the abuse of purgative medicines, that is to say, taking purgatives, not because the bowels require them, but because the patient feels uneasy; the habits of drinking, smoking, chewing tobacco, opium eating, and drinking tea and coffee in excess. If any particular article of food seem to disagree, it should be carefully avoided. Where there is much flatulence, vegetables in excess will often be found to increase the disorder. Wine will sometimes require to be exchanged for weak brandy and water, or brandy with soda or Seltzer water; and common beer for the bitter ale.

II. The second indication is fulfilled by remedies belonging chiefly to the class of tonics; by the bitter infusions, such as the infusions of quassia and gentian, with the aromatic waters; by the mineral waters of Buxton or Selters; by quinine; by the mineral tonics, bismuth, steel, zinc, and nitrate of silver; and by the mineral acids. These remedies, if not incompatible with each other, may be given in combination, or they may be combined with aperients. In mild cases of dyspepsia, a dinner pill consisting of rhubarb, ginger, and capsicum in combination, may be given about an hour before dinner with great advantage.

III. The third indication must be met by remedies appropriate to the several accidental combinations. If there is great acidity, alkalies are indicated, as the liquor potassæ, or the carbonate of soda; if constipation, aperient medicines regularly administered, so as to relieve the bowels without inducing hypercatharsis; if there is yellowness of the skin, or conjunctiva, or the evacuations are clay-colored, or there is hæmorrhage from the stomach or bowels, small doses of mercurial preparations; if diarrhœa, a strict regulation of the diet,

and, if necessary, the remedies mentioned under that head; if constant sickness, hydrocyanic acid given at short intervals, in doses of three drops of the dilute acid cautiously increased. If the symptoms of subacute gastritis should supervene, the treatment proper to that disease. If gastralgia or pyrosis exist, the remedies recommended under those heads.

It must be obvious that, in many cases, the treatment of dyspepsia must be tentative, and dependent on the combination of symptoms which happens to be present.

GASTRALGIA—GASTRODYNIA—CARDIALGIA.

SYMPTOMS.—Acute pain in the epigastrium, occurring at a variable interval of from half an hour to three hours after a meal, generally relieved by pressure and by food. It is associated with other symptoms of dyspepsia, and is often terminated by pyrosis.

DIAGNOSIS.—From subacute gastritis, by the pain in gastralgia coming on at an interval after taking food, but in subacute gastritis following directly upon the meal. By the pain in gastralgia being relieved, or not increased, by pressure, while in gastritis it is increased. By vomiting, if it be present, following directly upon the meal, and consisting of ingesta, in gastritis; at an interval, and usually consisting of clear fluid, in gastralgia.

CAUSES.—The common causes of dyspepsia; strong and sudden mental emotions, flatulence, the abuse of tea, coffee, and warm liquids.

TREATMENT—Indications.—I. To subdue the irritability of the stomach. II. To avoid the occasional causes. III. To improve the general health.

I. The remedies which best answer the first indication, are chalybeates and tonic infusions, the trisnitrate of bismuth, the sulphate of zinc, or the nitrate of silver, hydrocyanic acid, morphia, creasote, henbane; stramonium and belladonna may also be given with advantage. The trisnitrate of bismuth, in mild cases, is the best remedy; the stronger sedatives, of which hydrocyanic acid is the best, may be required in the more severe forms of the disease. The nitrate of silver, chalybeates, and tonic infusions, are likely to be most serviceable when there is relaxation of the mucous membrane of the stomach. Where there is much flatulence, alum, in combination with ginger, may be administered three times a day. Smoking tobacco or stramonium is often attended with benefit.

In one case in which there was some tenderness in the upper part of the spine, the tartar-emetic ointment, rubbed into the seat of pain, cured severe gastralgia, attended with dis-

treassing vomiting, after the trisnitrate of bismuth and hydrocyanic acid had failed.—(G.)

II. The second indication can only be fulfilled by attending to the patient's history of the effect of different kinds of food and drink upon his symptoms. These effects vary in every case. In one patient, the disease will disappear on leaving off the use of tea; another will derive the same benefit from abstaining from potatoes.

III. The improvement of the general health may be effected by regular living, early rising, cold spunging followed by friction, or the cold bath, and by change of air. The state of the bowels requires careful attention.

PYROSIS—THE WATER-BRASH

SYMPTOMS.—The disease usually comes on in the morning or forenoon, when the stomach is empty; commencing with ardent pain at the pit of the stomach, with sense of constriction, as if that organ were drawn toward the back. The pain is increased by an erect position, and therefore the body is bent forward. After a short time, an eructation takes place of a thin, watery fluid, in considerable quantity; sometimes of an acid taste, often quite insipid. The eructation is frequently repeated, and at length gives relief to the pain, and puts an end to the fit. It is generally accompanied by gastralgia.

CAUSES—Predisposing.—It principally attacks those of a middle age; females more frequently than males; and generally the unmarried; people in low life, who live much on milk and a farinaceous diet, rather than those in better condition; fluor albus.

Exciting.—Prolonged abstinence; violent emotions of the mind.

TREATMENT.—That of gastralgia. If the liquor ejected from the stomach be acid, alkalies, as liquor potassæ or carbonate of soda, may be combined with the other remedies. Nitrate of bismuth is often a very effectual remedy; and in more severe cases, nitrate of silver.

HÆMATEMESIS—VOMITING OF BLOOD.

SYMPTOMS.—A hæmorrhage of dark-colored grumous blood from the stomach, in a greater or less quantity, often mixed with food, and preceded by a sense of weight and obtuse pain or anxiety in the region of the stomach.

CAUSES.—The general causes of hæmorrhage, as plethora, suppression of evacuations, &c.; tumors compressing the liver or spleen; external violence; obstructions in any neighboring viscus; rupture of a blood-vessel. The fluid is inhaled

from the mucous membrane, which is congested, with patches of a red or livid color.

PROGNOSIS.—Hæmatemesis seldom proves fatal from the loss of blood, but it often induces very considerable weakness. When the bleeding is symptomatic of some other disease, the prognosis must depend on the probability of that disease being cured.

TREATMENT.—In most cases, rest, a bland farinaceous diet, cold liquids, and small doses of hydrargyrum c. cretâ to act upon the liver, followed by gentle aperients, are sufficient to cure the disease.

If accompanied by symptoms indicating an inflammatory diathesis, bleeding, and the antiphlogistic regimen, and iced water or rough ice, with pounded ice to the pit of the stomach.

When the hæmorrhage has ceased, we must endeavor to prevent its recurrence by a course of alteratives and aperients, and a strict attention to the general health.

When the disease is caused by suppression of the hæmorrhoidal or catamenial flux, leeches should be applied to the anus or vagina, together with other appropriate remedies for such diseases.

When the disease occurs in delicate or scorbutic habits, tonics and quinine, with the mineral acids, are indicated.

CARCINOMA OF THE STOMACH.

SYMPTOMS.—A circumscribed tumor in the epigastrium, accompanied by pain of a burning, gnawing, or lancinating character; nausea; acid or bitter eructations; vomiting of ingesta, of mucus, of blood, or of a grumous or sanious matter; constipation; great emaciation; and the hue and expression of countenance indicative of the cancerous diathesis.

MORBID ANATOMY.—The most common form of the disease is that of scirrhus, and its most common seat the pylorus. The stomach is generally contracted when the disease occupies the cardiac extremity; greatly expanded and hypertrophied when the pylorus is affected. The disease may assume all the forms described in the introduction (p. 57).

DIAGNOSIS.—The only pathognomonic signs are the local tumor and the peculiar complexion of the patient. In advanced stages of the complaint, the extreme emaciation and the sanious discharges will assist the diagnosis. The disease, too, rarely occurs before forty. The part of the stomach which is affected may be generally inferred from the symptoms. When the cardia is the seat of the disease, the pain and vomiting come on immediately after taking food; when the pylorus is the seat of the disease, these symptoms come on later.

410 PERFORATION OF THE STOMACH—ENTERITIS.

CAUSES—*Predisposing*.—Cancerous diathesis ; the male sex. *Exciting*.—Long-continued dyspepsia. All causes of inflammation or congestion in the stomach. Depressing passions ?

TREATMENT.—A bland and nourishing diet, such as the stronger soups thickened with arrow-root, jellies, farinaceous puddings, &c. The digestive fluid ; nutritive enemata. Leeches, to subdue occasional inflammation ; narcotics and sedatives, to allay pain ; anodyne plasters, fomentations, and embrocations, externally ; rest.

PERFORATION OF THE STOMACH.

SYMPTOMS.—Intense pain in the epigastrium occurring suddenly, followed by the symptoms of peritonitis, and proving rapidly fatal.

CAUSES—*Predisposing*.—The female sex. Youth.

Exciting.—Ulceration of the mucous membrane ; softening ; carcinoma ; irritant poisons.

DIAGNOSIS.—The pathognomonic symptom of ulceration of the stomach or intestines is the suddenness of the attack.

PROGNOSIS.—In the highest degree unfavorable.

TREATMENT.—That of peritonitis. When collapse has set in, stimulants, with opiates.

DISEASES OF THE INTESTINES.

ENTERITIS	Inflammation of the Intestines.
DIARRHŒA	Purgings.
DYSENTERIA	Dysentery.
MELÆNA	Hæmorrhage from the Bowels.
TORPOR INTESTINORUM . .	Constipation.
COLICA	Colic.
COLICA PICTONUM	Painters' Colic.
TYMPANITES	Drum Belly.
HÆMORRHOIS	Piles.
TABES MESENTERICA.	
INTUS-SUSCEPTIO.	

ENTERITIS—INFLAMMATION OF THE INTESTINES.

SYMPTOMS.—Acute pain in the abdomen, increased by pressure, varying in situation with the inflamed part of the intestine, and gradually extending to the whole abdomen ; accompanied by swelling and tension ; the patient lies on the back, with the knees drawn up, and can scarcely suffer the pressure of the bed-clothes. There is obstinate costiveness ; nausea and constant vomiting, the matters rejected being

generally bilious, and in some instances highly offensive, and in still rarer cases stercoraceous; highly-colored urine; pyrexia; frequent, hard, contracted pulse; great prostration of strength.

In fatal cases the swelling and pain increase, hiccough sets in, the pulse becomes irregular, the extremities grow cold; the skin is bedewed with a cold sweat, the features are pinched and sharpened, and death takes place from exhaustion, preceded by a cessation of pain.

ANATOMICAL CHARACTERS.—The disease consists in inflammation of the peritoneal coat of the intestines, which generally involves the muscular coat and cellular tissue at the same time.

TERMINATIONS.—*In resolution*, known by gradual diminution of the symptoms, and a free evacuation of the bowels.

In *gangrene*, marked by a sudden cessation of pain and anxiety, the patient becoming calm and collected, while the countenance assumes a livid and indescribably cadaverous hue; suppression of urine, hiccough, subsultus tendinum, delirium, convulsions, death.

In *ileus*, from the formation of false membranes, or the permanent contraction of the intestines.

CAUSES.—Local irritation or obstruction, irritant poisons, incarcerated hernia, colic, ileus, indurated fæces.

DIAGNOSIS.—*From Colic*, by the one being accompanied by fever, the other not; by the peculiar pulse above described; by the pain in enteritis being constant and increased by pressure; and in colic, intermittent and alleviated by pressure.

PROGNOSIS.—*Favorable.*—Gradual remission of pain and other symptoms; the abdomen becoming less tender to the touch; the pain changing its seat; the belly no longer obstructed, a warm, equable sweat, the urine depositing a sediment, the pulse becoming more full and soft, and less frequent.

Unfavorable.—The increase of the symptoms; collapse; a sudden cessation of pain; stercoraceous vomiting.

TREATMENT.—General and free blood-letting, followed by the application of leeches in large numbers to the part of the abdomen where the pain is most severe, the bleeding being encouraged by warm fomentations. Calomel and opium in the dose of two or three grains of the former, with a grain of the latter, repeated at intervals of one, two, or three hours for three or four times in succession, and followed, if the pain and tenderness have subsided, at an interval of one or two hours from the last dose, by a full dose of castor oil. If the disease is not subdued by this treatment, the calomel and opium should be continued so as to affect the gums. Enemata of warm

water or warm gruel should be frequently administered, so as to remove any accumulation of fæces which may exist in the large intestines.

Enteritis may become chronic, and in such case the antimonial ointment or a blister should be repeatedly applied to the abdomen.

When the coats of the stomach and intestines are affected at the same time, the disease is called gastro-enteritis. It is never witnessed except as the effect of irritant poisons. The symptoms are those of gastritis and enteritis combined.

Inflammation of the mucous membrane of the stomach and intestines, or the so-called English cholera, is a disease confined entirely to the mucous membrane, and not to be confounded with the more severe affection attacking the peritoneal covering of the stomach and bowels.

REMEDIES.—Tobacco smoke, or a weak solution of tobacco thrown up into the intestines. The use of strong purgatives—a practice to be strongly reprobated.

DIARRHŒA—LOOSENESS, OR PURGING.

CHARACTER.—Frequent and copious discharges by stool, accompanied by much griping, flatulence, and a sense of weight and uneasiness in the lower belly. Nausea and vomiting, and a furred or morbidly-red tongue, are frequent concomitants. In chronic cases, great emaciation.

CAUSES.—The application of cold to the surface of the body; suppressed perspiration, depressing passions of the mind; high temperature; indigestible food; acid fruits; putrid substances; the abuse of active purgatives; previous constipation; worms; retrocedent gout or rheumatism; phthisis pulmonalis.

DIAGNOSIS.—From *Dysentery*, by being unattended either with inflammation, fever, or tenesmus; by the absence of blood from the stools.

The state of the mucous membrane is not the same in all forms of diarrhœa. In some cases there is inflammation, with consequent increase of secretion; in others, congestion from a sluggish circulation through the liver; in others, again, ulceration of the intestines. Diarrhœa may also be caused by the presence of ill-digested food, by substances belonging to the class of purgatives, by scybala in the intestines, and by any obstacle to the absorption of chyle, or to its flow through the lacteals.

TREATMENT.—When the diarrhœa is recent, the treatment is extremely simple. If the motions are frequent, scanty, and accompanied by some degree of tenesmus, a gentle laxative, as an ounce of castor oil, combined with ten or twenty drops of tincture of opium, is indicated. If the discharge from the

bowels be abundant, whatever may be its appearance and character, all that is required is to restrict the patient's diet to gruel, arrow-root, or sago, made with or without milk, to the total exclusion of all solid matter. If the disease should not yield to this simple treatment in one, two, or three days, it will be necessary to continue the diet, and to administer small doses of hydrargyrum c. cretâ three times a day, in combination with a few grains of Dover's powder, or the pulvis cretæ c. c. opio. One or two grains of hydrarg. c. cretâ, with from three to five grains of Dover's powder, is a sufficient dose, or ten grains of the pulvis cretæ c. c. opio. In the diarrhœa of children at the breast, from half a grain to a grain of hyd. c. cretâ, with a little sugar, or, when the child is restless, with two grains of the pulv. cretæ c. c. opio, will soon effect a cure.

This treatment is applicable to all forms of diarrhœa, with the exception of that which consists in a discharge of an abundant grumous matter, closely resembling coffee-grounds, and probably consisting of blood altered in its appearance and character. For this form of the disease, the remedy usually prescribed is sulphate of copper in the dose of a quarter to half a grain, with from half a grain to a grain of opium every three or four hours. When this has failed, I have employed the nitrate of potash in ten-grain doses with the best effect.—(G.)

The diarrhœa which accompanies ulceration of the mucous membrane of the intestines, and which is so distressing a symptom of the advanced stages of phthisis pulmonalis, is often removed by the regulation of the diet, and the administration of small doses of hydrarg. c. cretâ. If these fail, sulphate of copper, in doses of one sixth or one fourth of a grain, with one fourth of a grain of opium three or four times a day, may be given with great advantage.

In diarrhœa from functional disorder of the intestines, the remedies commonly used are unnecessary, and often injurious. A bland farinaceous diet in recent cases, and small doses of hyd. c. cretâ in chronic ones, form the most simple, the most reasonable, and the most effectual treatment.

If there should be much tenderness of the abdomen on pressure, leeches, followed by warm fomentations, will be necessary; if much griping, starch injections, with opium, will be useful; if sudden debility and faintness, brandy added to the farinaceous diet.

REMEDIES.—Chalk, kino, alum, hæmatoxylum, simaruba, liquor calcis, the aromatic confection, tannin, and the sulphates of zinc and copper.

DYSENTERIA—DYSENTERY.

SYMPTOMS.—The disease sometimes comes on with cold shiverings, followed by fever; at others, the local affection is first perceived. There are costiveness; flatulence; severe griping pains; fixed pain, with great tenderness in the hypogastrium; frequent inclination to go to stool, with a scanty discharge of indurated fæces, of pure mucus, of mucus mixed with blood, of pure unmixed blood, of pus, of a putrid sanies, and sometimes of films of false membrane; tenesmus; dysuria; cramps in the limbs. As the disease advances, it produces great emaciation and debility; a quick and weak pulse; a sense of burning heat, and intolerable bearing down of the rectum; hiccough; and the disease often terminates fatally with symptoms of collapse.

CAUSES.—*Predisposing.*—A high temperature. *Exciting.*—A specific contagion? exposure to wet and cold.

ANATOMICAL CHARACTERS.—Ulceration of the large intestines, and enlargement of the glands.

PROGNOSIS.—*Favorable.*—A gentle diaphoresis; the stools becoming yellow and less frequent; the strength little impaired; sediment in the urine.

Unfavorable.—Violent and distressing tenesmus and tormina; vomiting; hiccough; aphthæ; difficult deglutition; convulsions; cold extremities; delirium; cold and partial sweats; the tongue preternaturally red and dry; the pain suddenly ceasing; great prostration of strength; the motions extremely fetid; petechiæ; involuntary evacuations; intermitting pulse; the disease being complicated with, or supervening upon others; as affections of the liver, with intermittent fever, gastro-enteritis, &c.

TREATMENT.—If there is much fever, general blood-letting may be required; in less severe cases, leeches to the tender spots of the abdomen, followed by warm fomentations. Opium in the solid form or in the shape of Dover's powder, combined with small doses of calomel, blue pill, or hydrarg. c. cretâ to act upon the liver, may be given in full doses every one, two, or three hours, according to the severity of the symptoms, and followed at intervals by an ounce of castor oil. Two or three ounces of starch, with half a drachm of laudanum, or a suppository of one or two grains of opium, may, at the same time, be introduced into the rectum.

Neither general nor local blood-letting is required in this country, except in very rare cases; a full dose of castor oil with ten or twenty drops of laudanum, and a careful regulation of the diet, being generally sufficient.

REMEDIES.—Emetics; acetate of lead with opium; ipecacuanha in small and repeated doses; injections of iced water:

asafœtida, turpentine, or tobacco enemata; balsam of copaiba; decoction of cusparia, combined with nitric acid and laudanum; leeches to the anus; strychnine; sulphate of copper with or without opium. In chronic cases, tonics and astringents; logwood; a decoction of the pomegranate, tannin, &c.

The strength should be supported by light preparations of barley, rice, sago, Indian arrow-root, flour, panada, and gelatinous broth.

The means above mentioned will be found totally inadequate to the cure of chronic dysentery, if a dusky sallow hue of countenance, tenderness upon pressure in the region of the liver, and a clayey appearance of what fæces happen occasionally to be voided, manifest the presence of a diseased and obstructed state of the liver. In such cases *mercury* is the only remedy; and this should be pushed to such an extent as to keep up a gentle affection of the mouth until the symptoms begin to be mitigated.

MELÆNA—HÆMORRHAGE FROM THE BOWELS.

Hæmorrhage from the bowels commonly occurs in persons subject to chronic dyspeptic complaints, and especially to disorders of the liver. Like hæmatemesis, it attacks those of a cachectic habit. It may occur alone, or in combination with hæmatemesis. It is rarely attended with pain, or with severe constitutional symptoms.

RATIONALE.—The blood is supposed to flow from the vessels of the intestines in consequence of obstruction to the flow of blood through the branches of the vena-porta distributed to the liver. It is rarely attended by any morbid changes in the mucous membrane of the intestines.

DIAGNOSIS.—From hæmorrhoids by the absence of soreness and tenesmus, and generally by the more abundant flow of blood.

TREATMENT.—The disease always yields to small doses of hydrarg. c. cretâ, with opium, or Dover's powder. A bland mucilaginous diet should at the same time be prescribed. For the treatment of an allied disease, viz., diarrhœa with dark coffee-ground evacuations, see Diarrhœa.

TORPOR INTESTINORUM—CONSTIPATION.

The causes of constipation are either structural or functional.

The *structural* causes either narrow the intestines or entirely obliterate the passage. In the one case, purgative medicines act, though with difficulty; in the other case, the mechanical impediment must be first removed.

Among the *functional* causes of constipation are, the absence of irritating matter from the diet, a deficiency of bile, want of proper exercise, spasmodic action of the muscular fibre, or paralysis of some part of the gut.

The *treatment* of constipation, depending on alterations of function, will depend upon the character of that alteration. If the food is deficient in indigestible matter, we must supply it by brown bread or fruits; if the bile is wanting, we must stimulate the secretions of the liver by mercurial preparations in small doses; if the habits are sedentary, we must enjoin proper exercise. The other functional disorders will be noticed under the head of Colic.

Habitual constipation is best treated by aloetic purgatives; by the compound rhubarb pill, with small doses of the extract of conium; by jalapine, or by such combinations of aperients as shall be found to agree best with the patient. Where the torpor of the bowels is still greater, and especially where there is a large accumulation of hardened fæces, purgative enemata are required, consisting of gruel with castor oil, oil of turpentine, Epsom salts, and infusion of senna, &c. If the enemata should return without bringing any scybalous matter away, a large quantity of warm water, or of air, should be injected through a long flexible tube introduced into the sigmoid flexure of the colon, as recommended by Dr. O'Beirne.

A stream of cold water poured from a height on the abdomen has sometimes relieved obstinate constipation. When the stomach is irritable, croton oil may be rubbed into the skin of the abdomen or inside of the thigh.

The management of constipation alternating with diarrhœa requires some care. Whenever diarrhœa is present, purgatives should be at once omitted, and they should not be resumed till it has ceased. This caution is especially necessary in nervous or other diseases, of which constipation is the cause, for these diseases are as much relieved by gentle aperients, as they are increased by hypercatharsis.

In obstinate constipation, careful inquiry should be made after mechanical obstructions, such as hernia, or intus-susceptio.

COLICA—COLIC.

SYMPTOMS.—Severe pain in the abdomen, retraction of the umbilicus, with a peculiar sense of twisting, occurring in paroxysms, and relieved by pressure; obstinate costiveness; flatulence; nausea and vomiting; with a pulse little increased in frequency, are the early symptoms.

These symptoms may subside after the operation of a purgative, or they may continue to increase in severity, the pain

becoming more fixed, and increased by pressure, the constipation more obstinate, the vomiting more urgent, the matters discharged sometimes consisting of bile, and more rarely of stercoraceous matter. Symptoms of local inflammation follow, and these, if not subdued, generally terminate in gangrene, indicated by the subsidence of the pain, frequent hiccough, prostration, cold sweats, and the facies Hippocratica. These are the symptoms of ileus or the iliac passion.

CAUSES.—Among the causes of the less severe and fatal forms of colic may be mentioned, cold applied to the surface of the body, especially to the lower extremities and abdomen; austere, acrid, or indigestible aliment; redundancy of acrid bile; collections of indurated fæces, or of calcareous concretions, in the alimentary canal; flatus; certain metallic poisons, as lead; hysteria; translation of gout; the imprudent use of astringents in diarrhœa and dysentery; worms; all these increased by a constitutional irritability of the intestines.

ANATOMICAL CHARACTERS.—Death rarely takes place from simple colic. The intestines, if free from mechanical obstruction and consequent inflammation, are found firmly contracted in one part, and extremely distended in that immediately adjoining it; the muscular fibre of the contracted portion being in a state of spasm, while that of the distended part is paralyzed.

DIAGNOSIS.—From *Enteritis*, by the peculiar twisting pain and retraction of the navel; by the absence of fever; by the pain in enteritis being increased, in colic alleviated, by pressure; by the irregular contraction of the abdominal muscles. The same characteristic symptoms distinguish it from inflammation of other abdominal viscera. From muscular pains of the abdomen by the effect of percussion with the points of the fingers. This produces sudden and severe pain when the muscles are affected, but has no effect in colic. In muscular pain, too, the sudden removal of pressure causes acute suffering.

PROGNOSIS.—*Favorable*.—The pain remitting or changing its situation; discharges of wind and fæces, followed by an abatement of symptoms.

Unfavorable.—Violent fixed pain; obstinate costiveness; sudden cessation of the pain, followed by more frequent hiccough, great watchfulness, delirium, syncope, cold sweats, weak, tremulous pulse; the pulse becoming peculiarly hard (see *Enteritis*); and the pain, before relieved, being now much increased upon pressure.

TREATMENT.—Having ascertained that there is no concomitant inflammation, and no mechanical obstruction which can be detected, and, at the same time, that the pain is not merely muscular, two or three grains of calomel, with half a grain or a grain of opium, according to the previous duration of the

constipation and the severity of the symptoms, should be given every one or two hours for three or four times in succession; the last dose being followed by an ounce of castor oil. If the bowels are not relieved by this treatment, a large clyster containing a drachm of the tincture of opium may be thrown up, either by means of the common clyster-pipe or through the flexible tube. Should the bowels still continue unrelieved, and there are still no symptoms of inflammation, the same medicines may be repeated till a free evacuation takes place. The pain may, in the mean time, be relieved by fomenting the abdomen with flannels wrung out of hot water or poppy fomentation. If signs of inflammation show themselves, or existed from the commencement, that inflammation must be promptly reduced by antiphlogistic measures. (See Enteritis.) For the removal of mechanical obstructions, the remedies appropriate to those obstructions.

COLICA PICTONUM—LEAD COLIC—PAINTERS' COLIC.

SYMPTOMS.—Those of colic from other causes, the pain generally coming on more gradually, and being often accompanied by pains in the limbs, or by weakness, or complete paralysis of the hands or forearms.

DIAGNOSIS.—From colic arising from common causes, by the history of the case and the employment of the patient; and generally by the blue line at the margin of the teeth, indicating the action of lead on the system.

PROGNOSIS.—Generally favorable. Five fatal cases in 500. (Andral.)

TREATMENT.—Calomel and opium in successive doses, followed by a full dose of castor oil; enemata of warm water, with hot fomentations or the warm bath; and when the pain is extremely severe, leeches to the abdomen. (See Colic.)

TYMPANITES—DRUM BELLY.

SYMPTOMS.—The disease sometimes comes on suddenly; at others it is more slow in its progress, and preceded by unusual flatulency, borborigmus, and a frequent expulsion of air upward and downward, attended with colic pains; the abdomen is distended, tense, and elastic; the bowels are costive; and dysuria is sometimes present. The abdomen, on percussion, sounds like a drum or bladder filled with air.

The air is, in almost all cases, contained in the stomach and intestines, its most common seat being the arch and sigmoid flexure of the colon. In very rare instances air passes into the sac of the peritoneum, in consequence of ulceration of the bowels. Tympanites is of common occurrence in typhoid fever, and is then styled "meteorismus."

CAUSES.—Loss of tone in the intestinal canal; errors in diet; excessive use of purgatives; abuse of warm liquids and of spirituous liquors; a crude vegetable diet; hysteria.

DIAGNOSIS.—From *Ascites*, by the absence of fluctuation, and by the sound being clear instead of dull.

TREATMENT.—*Indications.*—I. To evacuate the air.* II. To prevent its again accumulating.

To fulfill the first indication, recourse must be had to,

1. Antispasmodics and carminatives; opium, æther, oleum anisi, asafœtida, radix armoraciæ, tinctura capsici, cardamoms, ginger, alum, oil of turpentine, tincture of rhubarb.

2. Warm purgative medicines and clysters.

3. Friction with warm stimulating liniments.

4. Encircling the abdomen with a tight bandage.

5. The introduction of a fistula or elastic tube into the rectum.

The second indication requires,

1. Tonics, such as are recommended in dyspepsia.

2. Regular exercise.

3. Carefully avoiding all food of a flatulent nature.

4. The occasional use of stomachic aperients.

HÆMORRHOIS—THE PILES.

SPECIES.—1. *Hæmorrhoids tumens*; the tumors external.

2. *Hæmorrhoids procidens*; from protrusion of the anus.

3. *Hæmorrhoids fluens*; bleeding piles, internal, without external tumor or protrusion of the anus.

4. *Hæmorrhoids cæca*; blind piles, with pain and tumor of the anus, without effusion of blood.

CHARACTER.—Small tumors on the verge of the anus, or a number of varicose veins surrounding it: itching, weight, tension, and a sense of bearing down, or pungent pains in the fundament or perineum, more especially upon going to stool; pain in the back or loins; vertigo; headache; discharge of blood from within the anus; frequent desire to go to stool; varicose or enlarged veins; hard tumors, sometimes indolent or painful; excoriation or erythema about the anus.

CAUSES.—Habitual costiveness; plethoric state of the vessels; hard riding; excesses of various kinds; the suppression of some long-accustomed evacuation; the use of strong aloetic purgatives; pressure of the abdominal viscera on the hæmorrhoidal veins; pregnancy.

ANATOMICAL CHARACTERS.—The veins may be enlarged, the

* Dr. O'Beirne passes an œsophagus tube into the sigmoid flexure, and allows the escape of gas. He relates cases of this disease in typhus, malignant uterine phlebitis, peritonitis, and strangulated hernia, in which a cure was effected. On Defecation.—Graves and others confirm this statement.

cellular tissue thickened, or the morbid growth may resemble parenchymatous or erectile tissue.

PROGNOSIS.—The only unpleasant consequence in general to be apprehended from piles, is the presence of inflammation, which may induce suppuration, and consequent fistula. When a venous plethora exists, which is often the case in old age, bleeding piles are salutary, and their suppression is often followed by apoplexy, or hæmorrhage from other parts. Piles often relieve affections of the head, chest, abdomen, and uterus, and when suppressed, cause disease in these parts.

TREATMENT.—When the hæmorrhage is considerable, so as to occasion great debility, recourse must be had to astringents, both locally and internally.

The best way to stop the hæmorrhage when extremely profuse is by pressure. This may be most conveniently applied by dossils of lint or by the finger.

Local astringents; as alum, gall-nuts, &c.

Ice applied by introducing a small piece into the rectum.

If these are insufficient, astringents may be given internally. The best are the acetate of lead and opium.

If the pile is an enlarged vein, and this becomes strangulated by the spasm of the sphincter ani, it should be compressed and flattened with the finger and passed into the rectum. This plan may be repeated frequently. A T bandage may become necessary. The hip bath facilitates the reduction of strangulated piles.

When the tumors about the anus are painful, and accompanied by inflammation, leeches should be applied, and cooling lotions of solution of lead, or cold poultices.

The inflammation often runs high, and produces a considerable degree of fever. The antiphlogistic diet is then necessary, and the means recommended against synocha.

In all cases of hæmorrhoids the bowels should be kept loose, as the irritation of hardened fæces, both before and during their passage over the piles, creates much distress. Oleaginous purges are most serviceable, though sulphur is generally resorted to.

When, instead of being inflamed, the tumors are relaxed and flaccid, and at the same time irritable, astringent applications should be used, as galls, oak bark, balsam of copaiba, and cold; and astringents taken internally are likewise beneficial.

When, in consequence of long continuance of the disease, the rectum has become much affected and weakened, and excrescences or fistulas are threatened, Ward's paste has been of great service.* Tonics and chalybeates are necessary in debilitated constitutions.

* The following is the formula for Ward's paste: R. Radicis enulæ

If the tumors close the anus, we must introduce a common candle, an oiled bougie, tents, or a piece of sponge well oiled. Patients affected with piles should sleep on a hair mattress, sit as little as possible, and if sedentary or literary, pursue their avocations in the erect posture. The bowels should be opened daily either by coarse bread, the electuary of sulphur, or castor oil.

When these means fail, the tumors may be removed by excision.

Half a pint of cold water injected into the rectum twice or thrice a day, and retained as long as possible, is a most effectual remedy.—(G.)

TABES MESENTERICA.

This name is given to a tubercular or scrofulous degeneration of the mesenteric glands, which sometimes occurs without any disorder of the functions of the alimentary canal, but in by far the majority of cases follows upon long-continued irritation or ulceration of the mucous membrane of the intestines.

SYMPTOMS.—These are extremely obscure when the disease is idiopathic; but when it is the result of disease in the intestinal canal, it is characterized by the symptoms of infantile remittent fever. The only certain sign of this complication is the enlargement of the glands felt through the parietes of the abdomen.

CAUSES.—*Predisposing.*—The scrofulous or tubercular diathesis; the age of infancy and childhood; improper food; bad air. *Exciting.*—Irritation of the mucous membrane of the intestines from scybala, from worms, or from improper food.

TREATMENT.—This will depend upon the existing complications, and on the condition of the bowels which have preceded and produced it. Purgatives regularly and perseveringly administered in constipation; a strict regulation of the diet in diarrhœa; food adapted to the age and strength of the child; and, where great debility is present, tonics; the treatment, in fact, of infantile remittent fever. (See p. 213; see, also, Diarrhœa.) The affection of the glands itself requires gentle friction, with oil or stimulating liniments, two or three times in the day. In extreme cases, iodine ointment may be used for this purpose. The treatment of infantile remittent fever, aided by frictions to the abdomen, will often remove considerable enlargement of the mesenteric glands, and restore the patient to perfect health. As these glandular enlargements occur in

campanæ; piperis nigri, singulorum, ℥ss.; seminis fœniculi dulcis; mellis despumati, aa ℥j.: fiat pasta, de qua summat æger quantitatem nucis moschate bis terve die.

children of a tubercular diathesis, the chest should be carefully attended to, and directions should be given for a close attention to the future health of the patient.

INTUS-SUSCEPTIO.

SYMPTOMS.—Those of colic. The history of the case is most commonly as follows: After a violent straining at stool, a sudden attack of severe colic or ileus, followed by constant desire to go to stool, violent tormina and tenesmus, discharge of a small quantity of bloody mucus, and the symptoms of enteritis. These symptoms are not decisive, but the existence of the disease becomes more probable after the failure of attempts to evacuate the bowels.

ANATOMICAL CHARACTER.—One portion of the intestines inclosed within another. A natural cure is sometimes effected by adhesion, suppuration, gangrene, and separation of the inclosed portion of intestine.

TREATMENT.—That of colic and enteritis combined

REMEDIES.—Crude mercury, or small shot swallowed to the extent of two or three pounds. Injections of air. An operation, too, has been performed with success, an incision being made into the abdomen and the strangulated portion of the intestine liberated.

VERMINATIO—WORMS.

The human primæ viæ are infected by five kinds of worms.

1. *Ascaris vermicularis*: the small white thread or maw-worm.
2. *Ascaris lumbricoides*: the lumbricus teres, or long round worm.
3. *Trichuris*, or *triocephalus dispar*: the long hair-tailed thread-worm.
4. *Tænia solium*, or tape-worm.
5. *Tænia lata*: the broad tape-worm.

The ascarides have usually their seat in the rectum, and are of frequent occurrence in children; the lumbrici occupy the small intestines, and sometimes the stomach; the trichurides the cæcum; the tænia the whole track of the intestines, more especially the ileum.

SYMPTOMS.—Worms mostly produce symptoms of colic, with swelling and hardness of the belly; a variable, and often voracious appetite; fetid breath; picking of the nose; sensation of heat and itching in the anus; grinding of the teeth during sleep; short dry cough; frequent slimy stools; emaciation; slow fever, with an evening exacerbation; irregular pulse; sometimes convulsions or fainting fits.

CAUSES.—Obscure. Unwholesome food; unripe fruit.

They are evolved from ovula that exist in the human body, and in no other situation.

REMEDIES.—For the thread-worm, simple aperients, of the submuriate of mercury, scammony, aloes, or rhubarb. For the other species, oil of turpentine in doses of half an ounce, followed, after one or two hours, by an ounce of castor oil. Other remedies are, spigelia, cowage, tin, asafœtida, lime-water, tobacco; enemata of camphor, asafœtida, or tobacco; a decoction of the *geoffræa inermis*, or cabbage-bark.

Turpentine has been given with most success, and of late its use has become general. The best way to give it is alone, on a empty stomach, in the dose of half an ounce, to be followed after an interval of two hours by an ounce of castor oil, or a full dose of any brisk aperient. It produces a slight vertigo, and a sense of warmth and heat in the œsophagus and stomach, like to that produced by a glass of brandy; but these are very transient. Three or four evacuations are mostly produced by half an ounce.

DISEASES OF THE STOMACH AND INTESTINES.

GASTRO-ENTERITIS MUCOSA . . . English Cholera.

CHOLERA MALIGNA . . . Malignant Cholera.

GASTRO-ENTERITIS MUCOSA—ENGLISH CHOLERA.

SYMPTOMS.—Nausea, pain, and distention of the stomach and intestines; quickly succeeded by violent and frequent vomiting and purging of bilious or seculent matter, and, when this has been discharged, of mucus; a furred tongue; a frequent, small, and sometimes unequal pulse; much thirst; and heat, followed by cold sweats; great anxiety, painful cramps of the extremities; and, in rare cases, universal convulsions; hiccough, and sometimes death, within the space of twenty-four hours. In very severe cases, blueness of the surface.

CAUSES.—Excessive heat, or sudden transitions from heat to cold; the autumnal season; food of difficult digestion; rancid food; the colder fruits, such as cucumber, melon, &c.; active and violent purgatives; irritant poisons; catarrh.

PROGNOSIS.—*Favorable*.—A gradual diminution of the symptoms, especially of the vomiting; succeeded by sleep, or a gentle moisture on the skin. The disease, when protracted to the third or fourth day, seldom proves fatal.

Unfavorable.—Painful cramps of the extremities; convulsions; great prostration of strength; cold, clammy sweats; anxiety; great distention of the abdomen; short, hurried respiration; continual hiccough; intermitting pulse.

TREATMENT.—An immediate restriction of the diet to farinaceous substances, to the entire exclusion of solid food, is sufficient even in severe cases to effect a cure. A mucilaginous mixture, with twenty drops of tincture of hyoscyamus, may be given at the same time, three or four times a day. When there is great prostration of strength, the same diet with stimulants and opium, warmth to the surface and feet, and mustard sinapisms to the extremities. When the disease has subsided, the usual diet must not be immediately resumed, but the patient should be confined for a few days to a less strict farinaceous diet. Tonics and generous diet may then be necessary for the restoration of the patient's strength.

Calomel has been recommended, but is unnecessary, and may be injurious. Rest to the stomach and bowels is the rational treatment, and this is secured by the diet prescribed.

CHOLERA MALIGNA—MALIGNANT CHOLERA.

SYNONYMS.—Epidemic, spasmodic, Indian, Asiatic, blue, pestilential cholera.

SYMPTOMS.—The symptoms almost always show themselves during the interval between sunset and sunrise, beginning sometimes suddenly, at others after slight uneasiness and some degree of diarrhœa. The diarrhœa is more or less intense, with feculent dejections at first, but speedily assuming the appearance of rice water or gruel; there are flying pains, or sense of coldness in the abdomen, as if purgative medicine was about to operate; the countenance is pale; there is anorexia, nausea, or vomiting; nervous agitation, diminished muscular power, slight or severe cramps in the legs, arms, abdominal muscles, and loins; small, weak pulse; cold, clammy, or moist skin; thirst, and urgent desire for cold water: these symptoms, varying in intensity, may appear successively or simultaneously. In some cases the patient is struck down almost lifeless; in others, the disease steals on for eight or ten days. When it comes on suddenly, in addition to the above symptoms, the cramps commence in the fingers and toes, and rapidly extend to the trunk; the eyes are sunk, and surrounded by a dark circle; there is vomiting and purging of white matters, mixed with flocculi; the features are contracted and sharpened, the expression of countenance wild and confused. The face, extremities, and sometimes the whole surface of the body, assume a leaden, bluish, or purplish hue, varying in intensity; the extremities are shrunk and contracted, the nails blue, the pulse thready or imperceptible at the wrist, arm, axilla, temple, or neck; the skin cold and damp; there is great restlessness; incessant jactitation; severe pain in the epigastrium, loud moaning or groaning,

difficult, oppressed respiration; inspiration difficult, expiration short and convulsive, voice plaintive or nearly suppressed, the patient speaking in a hoarse whisper; the tongue is white, cold, and flabby, the temperature often as low as 79° or 77° ; convulsions recurring at short intervals, occasionally almost tetanic, or replaced by a constant tremor. The secretions of bile, saliva, tears, and urine are entirely suppressed, and there is an earthy or cadaverous odor exhaled by the body. Death generally takes place in from six to twenty-four hours, the patient retaining his faculties to the last.

TERMINATIONS.—In recovery; in prolonged gastric irritation; or in secondary fever, of the typhoid character.

MORTALITY.—About one half of the cases. Less in the young than in those advanced in life.

CAUSES.—The disease is epidemic, but not contagious? For an able examination of the question of contagion, see *Libr. Pr. Med.*, art. Cholera, Dr. George Budd. The conclusion at which the author arrives is, that malignant cholera is not propagated by contagion.

PROGNOSIS.—*Favorable Symptoms.*—In cases about to terminate favorably, reaction gradually takes place, and all the symptoms improve; the cramps cease, the dejections contain bile, urine is secreted, the voice and pulse return, there is an increase of animal heat in the extremities and surface of the body, and improved expression of countenance. Youth and previous health are favorable circumstances.

Unfavorable.—Coldness and blueness of the surface; contraction of the features; small, irregular, and thready pulse; oppression and difficulty of respiration; delirium; sordes on the teeth, lips, and gums; increased prostration of the vital powers; involuntary evacuations; subsultus tendinum; convulsions. Advanced age and previous debility, or ill health, are unfavorable circumstances, and the disease is more fatal in females than in males.

TREATMENT.—There is no disease for which such a variety of remedies has been proposed, or in which all remedies so completely fail, as the epidemic cholera.

REMEDIES.—Venæsection; emetics; warm and hot air baths; exhausted air bath; frictions, with every form of stimulating liniment; internal stimulants, as in the last stage of fever. Saline medicines; injections of warm water and saline solutions into the veins; inhalation of oxygen gas; calomel, in scruple or half-drachm doses every hour; cajeput oil; galvanism; nitric acid applied to the nuchæ; actual cautery along the spine; large doses of opiates; strychnine; acetate of lead in combination with opium; copious libation of cold water.

During the prevalence of the cholera in London, cases of diarrhœa were unusually prevalent, and as the disease often sets in with diarrhœa as its first symptom, it is probable that a judicious treatment of slight diarrhœa may contribute to diminish the number of cases of cholera. In treating such cases, the common remedy for diarrhœa, viz., a strict mucilaginous diet, must be combined with strong stimulants frequently administered.—(G.)

[In the year 1832 the cholera passed across the Atlantic with the British emigrants to Montreal and Quebec. About a month after, it appeared in the city of New York; subsequently in Philadelphia, New Haven, Baltimore, Richmond, Edenton, Mobile, New Orleans, and along the St. Lawrence lakes and Upper Mississippi. It reappeared in many of these places in the year 1834, but has not since prevailed as an epidemic.]

[CHOLERA INFANTUM.]

SYMPTOMS.—Diarrhœa is usually the first and only symptom which cholera infantum exhibits on its invasion. In the worst cases, however, vomiting may occur from the very commencement, and such instances are usually fatal in a few days. In an ordinary case of this disease, diarrhœa commences and continues for a few days before the stomach manifests any participation in the morbid changes which occur in the system. Ordinary fœcal matters constitute the character of the discharges at the beginning; but as the disease advances the alvine evacuations become serous and variously colored, from a dirty white to a brownish, and sometimes a greenish hue. These discharges are sometimes frothy, like yeast, and mixed with the food that has been taken, scarcely altered by the digestive process. At other times blood is mixed with the evacuations, exhibiting the appearance of dysentery.

Vomiting and purging, together with a raging thirst, constitute the chief symptoms of the disease. The tongue in most instances is dry and almost destitute of fur, and either of a dirty white or of a red color, especially when the disease affects more particularly the gastric organ. The fever is very irregular, with the heat affecting different parts of the body in a very irregular manner. The surface of the body, as the disease advances, becomes dry, and of an ash color, and from the excessive emaciation, hangs in folds over the shrunk muscles. The brain soon becomes the seat of congestion, with the usual symptoms of suffused eyes, heat of the integuments, and drowsiness. The integuments of the abdomen, also, are very much heated toward the termination of the disease. The pulse is small throughout, and indicates a great

degree of irritability. Cholera infantum usually runs its course in about three weeks, although it has been protracted even to some months.

MORBID APPEARANCES.—Morbid alterations in the mucous follicles of the intestines; inflammation of the intestines, more especially of the duodenum, jejunum, and ileum; enlargement and engorged state of the liver, even in some instances occupying as much as two thirds of the abdominal cavity.—(*Horner.*)

CAUSES—Predisposing.—Teething, and improper food; both these causes being connected with the development of the mucous follicles of the intestines: the morbid condition of which constitutes the disease in question.

Exciting.—Summer heat of a long continuance, connected with the impure air of cities. It is consequently found to prevail extensively during the heat of summer among the crowded population of our large cities, spending its force among the inhabitants of those portions of the city where poverty deprives them of the means of availing themselves of the advantages of suitable airy dwellings.

TREATMENT.—The first indication is to remove the exciting causes of the disease; for ordinary therapeutic agents will avail but little if the child be still exposed to the action of heat and impure air. It is indeed difficult among the poor to correct the extreme heat and to render the air more pure, but much might be accomplished by frequently spunging the body with cool water when the heat of the weather is excessive, and by a walk in the cool of the day. Those whose circumstances admit of a free ventilation of their dwellings ought to have their bedrooms exposed to a current of air during the day, while the children are kept as much separated as possible during their sleeping hours. It is not an uncommon thing to see children suffer greatly from the effects of heat and stagnant air after a hot night, where several sleep in the same apartment. These measures are more of a prophylactic than of a remedial nature.

The next indication is to relieve the congested state of the liver, and thus restore the circulation through that organ, and free the loaded vessels which convey the blood through it from the intestines. The physician, for the most part, is called too late to relieve the congested state of the liver by means of local bleeding. This indication, therefore, is to be fulfilled by the use of calomel, which exerts a highly beneficial effect by restoring the secretion of bile. No amendment can be expected until a free secretion of bile appears in the discharges. Dr. Edward Miller first recommended calomel, in the *New York Medical Repository*, in the year 1800. To a child of

two years, a pill containing one third of a grain of calomel and one sixth of a grain of opium may be given every fourth or sixth hour, according to the urgency of the symptoms. If there is but little vomiting, the opium may be omitted. The dose of calomel must be varied according to the age and constitution of the child, and the stage of the complaint. Dr. Dewees depended principally upon calomel in minute doses, uncombined with any other medicine. In whatever way it is given, a free secretion of bile should be the object for which we are to aim, and the use of this powerful agent must be continued until this is effected.

As to auxiliary remedies, these must vary according to the nature of the complications. Dover's powder may be given whenever there is much febrile action. The inflammation of the mucous membrane, when the most prominent symptom is to be allayed by the use of mucilages. These may be given by the mouth or by enemata; by the latter method when tenesmus is the most distressing symptom. The warm bath is likewise a highly useful auxiliary, especially at the commencement of the disease, before prostration has ensued.

Vomiting, the most obstinate of all the symptoms, renders it often extremely difficult to administer any remedy whatever. It is necessary at times, therefore, to control the vomiting, that the appropriate remedies may be introduced into the system. Lime-water and milk mixed in equal proportions, of which a tea-spoonful may be given every half hour; strong coffee, without either milk or sugar; a drop of laudanum; an enema of salt and water, for the purpose of transferring the irritation; a leech or two over the region of the stomach, when there is evidence of inflammatory action; ten to thirty drops of the spirits of turpentine, three or four times a day, have all been successfully used to control the vomiting in cholera infantum.

Where tenesmus is the most urgent symptom, and the disease puts on the appearance of dysentery, mucilaginous injections ought to be employed, and, if successful, a small quantity of the tincture of opium may be administered in the enema, as it is necessary often to do in cases of dysentery, with the precautions always necessary to be observed in administering opium to young infants and children.

When the disease is protracted, and the excessive discharge of serum characterizes the evacuations, astringents become necessary. Acetate of lead, given either alone or combined with Dover's powder or opium, has been used with success in severe and long-continued cases; catechu, kino, and pure argil, all have powerful astringent qualities, and may be employed in the condition just mentioned.

The convalescence is generally slow, and requires the assistance of mild bitters, gentle tonics, fresh air, and stimulating articles of food. The child has an instinctive desire for salted food, in which it may safely be indulged. The juice of shell-fish may be used with advantage during convalescence.]

DISEASES OF THE LIVER, SPLEEN, AND PANCREAS.

DISEASES OF THE LIVER.

ICTERUS Jaundice.

HEPATITIS Inflammation of the Liver.

BILIARY CONCRETIONS.

ICTERUS—JAUNDICE.

SYNONYMS.—Morbus arquatus ; morbus regius.

SYMPTOMS.—Languor ; inactivity ; loss of appetite ; sense of uneasiness or pain in the right hypochondrium ; heat and pricking of the skin ; bitter taste in the mouth ; the tunica conjunctiva of the eye of a yellow color, and soon afterward the whole surface of the body ; the urine is high colored, and tinges linen yellow ; nausea ; vomiting ; obstinate costiveness or diarrhœa ; the stools are of a clay color, but in some cases, like the urine, high colored ; the pulse is generally slow, yet sometimes, especially where the pain is acute, it becomes quick and hard, and there is a feverish heat, and dryness of the skin. Should the disease be long protracted, petechiæ and maculæ sometimes appear in different parts of the body ; the skin, before yellow, turns brown or livid ; even passive hæmorrhages and ulcerations have broken out, and the disease has in some instances assumed the form of scurvy.

CAUSES.—Biliary calculi in the gall-bladder, or its duct ; inspissated bile ; spasmodic contraction of the ducts themselves, often from violent passions of the mind ; pressure upon the ductus communis choledochus, either by collections of hardened fæces, or by tumors of neighboring viscera, as of the pancreas, of the mesenteric glands, of the pylorus, of the stomach, &c. ; diseases of the liver itself, as inflammation, partial scirrhus, &c. ; the active operation of some poisons and purgatives ; morbid redundancy of bile.

DIAGNOSIS.—The characteristic symptoms which distinguish this from every other disease are, the yellow color of the skin, and of the tunica conjunctiva of the eye ; the bitter taste in the mouth ; the yellow tinge communicated to linen by the urine ; the white or clay-colored fæces ; added to the sense of pain or uneasiness in the right hypochondrium.

PROGNOSIS—Favorable.—The disease having arisen from a cause that admits of easy removal; as spasm, accumulated fæces, temporary pressure during pregnancy, &c., &c.; the strength and appetite little impaired; the disease suddenly appearing; cessation of local pain, followed by bilious diarrhœa.

Unfavorable.—Circumstances leading to the suspicion of the disease having originated in a scirrhus state, either of the liver itself, or of the neighboring viscera; as the previous irregular life of the patient; long-continued local pain and tumor, &c.; symptoms of hectic; colliquative diarrhœa; symptoms showing a determination to the head, as vertigo, flushed countenance, headache; supervening anasarca; its being complicated with phthisis or any other disease.

TREATMENT.—When jaundice arises from inflammation of the liver, or from obstruction to the escape of bile from the duct, it requires the treatment of hepatitis and biliary concretions. (See those diseases.) When, however, there is no pain in the right hypochondrium, no fever, and the paroxysms of acute pain due to the passage of gall-stones are absent, the treatment will consist of small doses of mercurial preparations, as a grain of hyd. c. cretâ or blue pill, or half a grain of calomel in combination with small doses of opium, three or four times a day, aperients to keep the bowels free, and occasional emetics. This treatment is most appropriate to those cases in which the evacuations from the bowels are clay-colored. Where they, in common with the urine, are deeply tinged with bile, the purgatives and emetics alone are indicated.

REMEDIES.—Nitro-muriatic acid; nitro-muriatic acid bath; Bath and Cheltenham waters.

HEPATITIS—INFLAMMATION OF THE LIVER.

SPECIES.—1. Hepatitis acuta; 2. Hepatitis chronica.

ACUTE HEPATITIS.

SYMPTOMS.—Pain in the right hypochondrium, increased by pressure, by a deep inspiration, by coughing, or by lying on the left side; dry cough; difficulty of breathing; shooting pains in the chest, resembling pleurisy; sympathetic pain in the right shoulder; a yellow tinge of the tunica conjunctiva, and sometimes actual jaundice; high-colored urine; costiveness or diarrhœa. In some instances there is a deficiency of bile in the intestines, in which case the fæces are of a clay color; in other instances a superabundance, which is then rejected by vomiting and stool.

When the *concave* surface of the liver is affected, the pain

is more obscure, and is referred to the back; the breathing is less anxious, the functions of the stomach more disturbed, producing vomiting, hiccough, and other symptoms of gastritis.

When the left lobe of the liver adjacent to the stomach is inflamed, there is nausea or vomiting; and when the posterior and inferior portion of the organ near the kidney is implicated, there is more or less pain or disturbance in the function of the last-mentioned organ.

TERMINATIONS.—In resolution; in chronic disease; in abscess; in gangrene.

Abscess of the liver may burst into the stomach, and be emptied by vomiting; into the colon or duodenum, and be evacuated by the bowels; through the diaphragm into the cavity of the chest, and form empyema; into the lung or bronchial tube, and be expectorated; or into the corresponding muscles of the back, and open in that direction. The nature of the disease will be inferred from the color of the discharged matter, and from the rigors, throbbing pain, and hectic fever attending the process of suppuration.

CAUSES.—All the common causes of inflammation; biliary concretions; the violent operation of emetics; external injury; intense heat; intemperance in the use of spirituous liquors.

DIAGNOSIS.—*From Pneumonia*, by the pain in the shoulder; by the pain in hepatitis being increased by pressure, in pneumonia unaffected by it; by the difficulty, in pneumonia, of lying upon the affected side, while in hepatitis pain is occasioned by lying upon the opposite side; by the yellowness of the skin and conjunctiva; by the color of the urine and feces; by the cough being generally unaccompanied by expectoration.

From Gastritis and Dyspepsia, by the seat of the disease, discovered by tenderness upon pressure; and by the symptoms just detailed.

PROGNOSIS.—*Favorable*.—About the third, fifth, or seventh day, bilious diarrhœa; universal and free perspiration; copious sediment in the urine; inflammation appearing upon an external part; hæmorrhage from the hæmorrhoidal veins; an abatement of fever.

Unfavorable.—Intensity of pain and fever; the pain confined to a point; continual hiccough; cold extremities; obstinate constipation.

TREATMENT.—*Indications*.—Those of other acute inflammations.

They are best fulfilled by,

1. General blood-letting.

Most authors and practitioners have observed, that blood-

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letting ought not to be carried to the same extent in hepatitis as in the other genera of the phlegmasiæ. Some assign as a reason for this the peculiarity of the circulation through the liver; others, that the organ affected is less essential to life, or that the inflammatory symptoms do not often run so high as in the other inflammations.

General blood-letting is seldom serviceable after the fourth day; but the state of the pulse and urgency of the pain must always direct us with regard to it.

2. Local depletion by cupping or leeches.

When the hæmorrhoidal or catamenial evacuations are suppressed, the abstraction of blood from the anus is preferable. The leeching should be repeated so long as the pain is severe.

3. Blisters, applied over that part of the region of the liver in which the pain is.

4. Cathartics, especially sub-muriate of mercury.

5. Saline and antimonial diaphoretics.

Should suppuration take place, and an abscess form externally, it must be brought forward as quickly as possible by poultices and fomentations, aided by a generous diet, the use of quinine, cinchona, and bitters; and an early incision is to be made when it points.

6. Mercurial inunction, which is to be preferred to the internal administration of the preparations of mercury, with a view of affecting the mouth, especially during the inflammatory stage of the disease.

7. A low diet, consisting chiefly of farinaceous food.

CHRONIC HEPATITIS.

SYMPTOMS.—The attack of *chronic hepatitis* is in general so gradual, and the symptoms at its commencement so obscure, that it is long unattended to. It is marked by symptoms of dyspepsia, loss of appetite, flatulence, sense of fullness and distention of the stomach: at length the health is impaired, there is a sense of weight and obtuse pain in the region of the liver, increased by deep pressure, with an enlargement and preternatural hardness of the organ, obvious to the touch; or there is pain referred to the right shoulder; the countenance becomes sallow; the patient is torpid, inactive, and desponding; the functions of the primæ viæ are greatly disturbed; the bowels are obstinately costive; the stools clay-colored; and there are repeated attacks of jaundice, followed, at length, by dropsy.

In chronic hepatitis, and other diseases of the liver, accompanied by great enlargement of the organ, it presses on the vena porta, obstructs the return of the venous blood from the abdomen, causes congestion of the peritoneum and cellular membrane of the inferior extremities, and induces ascites

or effusion into the peritoneal cavity, and anasarca or œdema of the lower limbs. In such cases, a cure can not be effected without the removal of the disease of the liver, which is the cause of the dropsy. Many diseases of the liver, like those of all other organs, are incurable.

CAUSES.—The acute form; chronic dyspepsia; phthisis pulmonalis; hot climates; excess in eating or drinking; intemperance.

DIAGNOSIS.—From *Empyema* and *Pneumothorax* by the non-protrusion of the intercostal spaces in chronic enlargement of the liver, and in many instances by tracing the tumor from the margin of the ribs.

PROGNOSIS.—Probable remote termination in ascites and anasarca.

TREATMENT.—1. Mercurial preparations, in small doses, frequently repeated, with mercurial inunction, so as slightly to affect the gums.

2. The hydriodate of potass, or iodine given internally, and used externally.

3. A continued course of bitter tonics and aperients, as taraxacum, gentian, quassia or calumba, with soda.

4. The nitric, or nitro-muriatic acid, has been frequently of great use when mercury can not be employed, or when there is a redundancy of bile. It may be given internally, in doses of ten or twenty drops, with any of the tonic infusions, or it may be used greatly diluted with water, as a bath. (℞. *Acidi nitrici*, ʒss.; *acidi muriatici*, ʒj.; *aquæ puræ*, Oiv.)

5. Removal from a warm to a cold climate; a sea-voyage.

6. Chalybeates, of which the *tinctura ferri muriatis*, in doses of twenty drops or half a drachm, is the best.

7. When the intestinal canal is healthy, drastic purgatives are often more effectual than any other remedies.

BILIARY CONCRETIONS.

SYMPTOMS.—Biliary calculi give rise to no pain or inconvenience unless they occasion some impediment in the gall-ducts. The passing of the gall-stone is accompanied by the following symptoms: Intense pain in the epigastrium, extending to the right hypochondrium and back, occurring in severe paroxysms, with intervals of comparative ease, during which there is a dull, heavy pain in the epigastric region. The pain varies with the size of the calculus, and the force of the spasm which it occasions. The general symptoms are an infrequent full pulse, or a frequent and feeble pulse, with profuse perspiration; or if there is inflammation present, the general symptoms of fever. The passage of the calculus from the gall-ducts into the intestines is attended by a sudden remission of the pain.

TREATMENT—*Indications*.—I. To relieve the severity of the spasm. II. To reduce existing inflammation.

The first indication is fulfilled by opium, the warm bath, warm fomentations, emetics, and blood-letting. The *opium* may be given in doses of a grain, or twenty drops of laudanum, every hour, and in a glyster every six hours (forty minims to one drachm in four ounces of starch or gruel). The *warm bath* should be of the temperature of 100° to 110° , and should be continued till faintness comes on. *Warm fomentations* are generally employed, but it has been recommended to apply pounded *ice* to the epigastrium. *Emetics* have been extolled by some authors, and blamed by others. They are admissible in the absence of inflammation, but are scarcely safe when inflammatory symptoms exist.

The second indication is answered by *bleeding*, which is useful chiefly as an antiphlogistic measure; but as it produces debility, it tends to relax existing spasm. It should always be employed in plethoric persons, or in those prone to suffer from inflammatory diseases. It may be followed up by nauseating doses of tartar-emetic.

DISEASES OF THE SPLEEN AND PANCREAS.

DISEASES OF THE SPLEEN.

Enlargement of the spleen from congestion is a common consequence of *ague*, and the organ is also subject to several forms of morbid degeneration. Enlargement of the spleen, from whatever cause, is distinguished by the situation of the tumor in the left hypochondrium, extending, in extreme cases, to the epigastrium, the umbilicus, and the hypogastrium; by the tumor being solid and smooth, generally of an oblong shape, lying beneath the integuments, and movable. The organ which is the seat of the enlargement may also be inferred from the history of the case. The previous occurrence of *ague* will always afford a probability in favor of the tumor being situated in the spleen. The symptoms accompanying this affection are obscure, being for the most part due to interference with the functions of the parts submitted to pressure. Dull pain in the left side; dyspnoea; dry cough; inability to lie on the right side; depression of spirits; dyspeptic symptoms; and in extreme cases, dropsical effusions, and an unusual tendency to hæmorrhage, dysentery, and scurvy, may be mentioned among the more usual accompaniments of this disease.

The *treatment* will consist in the use of the iodine ointment, or tincture of iodine externally, and the hydriodate of potash,

with tonics, internally; leeches to the seat of the disease, if there is much abdominal tenderness; friction, in the absence of pain; gentle aperients and alteratives, and moderation in diet. If the disease has been preceded by ague, bark or quinine is the proper tonic, and should be preferred to all other remedies.

DISEASES OF THE PANCREAS.

The symptoms of disease of the pancreas are still more obscure than those of disease of the spleen. The enlargement which accompanies them is not readily distinguished from that of the adjoining viscera, and it is obviously very liable to be confounded with organic disease of the pylorus or duodenum. The symptoms generally present are a deep-seated obtuse pain in the epigastrium; nausea, sickness, and emaciation. To these may be added, as of occasional occurrence, constipation or diarrhœa, salivation, and jaundice. The *treatment* of supposed disease of the pancreas must be conducted on general principles, and must be so shaped as to meet the urgent symptoms that happen to be present.

DISEASES OF THE PERITONEUM.

PERITONITIS Inflammation of the Peritoneum.
ASCITES Dropsy of the Abdomen.

PERITONITIS—INFLAMMATION OF THE PERITONEUM.

SYMPTOMS.—After rigors, but, in some cases, without any preliminary symptoms; pain commencing in any part of the abdomen, and soon extending over the entire cavity, increased by pressure, and often so acute that even the weight of the bed-clothes is intolerable. The skin of the abdomen is hot; the pulse is in general small, hard, and contracted, though sometimes full and soft; the countenance is expressive of great suffering; the patient lies on his back with the thighs drawn upward and flexed on the abdomen; the bowels are constipated; the urine scanty and high colored; the tongue is white and covered with mucus, and soon becomes dry and brown, its edges and tip being red; the respiration is difficult, particularly during inspiration, and is chiefly performed by the ribs, as the diaphragm and abdominal muscles can not act without increasing the pain. When the disease advances without control, it often terminates fatally within twenty-four or forty-eight hours, and death is preceded by typhoid symptoms, great prostration of the vital powers, sudden cessation of pain, sharpened countenance, distention of the abdomen by

liquid or gas, vomiting of a coffee-colored fluid, cold extremities, and coma.

When the disease attacks puerperal women, the pain commences in the region of the womb, the lochia are diminished and speedily suppressed, the breasts become collapsed, and the secretion of milk ceases. (See Puerperal Fevers.)

When peritonitis occurs in consequence of perforation of the intestine, it is rapid and violent in its progress, and speedily causes death. It is very remarkable, however, that in transfixion of the bowels by bayonet and sabre wounds, in which the intestines are perforated in several parts, and blood and fæces escape into the cavity of the abdomen, there is but a slight degree of peritonitis, and recovery sometimes happens.

MORBID APPEARANCES.—Injection of the vessels of the peritoneum; coagulable lymph spread over the surface, or flakes of lymph floating in serum or pus; false membranes binding the folds of the omentum, or the several viscera together.

CAUSES.—Exposure to cold and fatigue; constipation, contusions, wounds, surgical operations; parturition.

PROGNOSIS.—*Favorable* in peritonitis from common and transient causes. *Unfavorable* in that produced by mechanical injury or organic disease.

DIAGNOSIS.—From *Rheumatism or Neuralgic Pains* of the abdominal muscles, by the pain in peritonitis being increased by pressure, while that situated in the muscles is relieved, or not increased, by steady pressure; also by the presence of *severe* constitutional symptoms in peritonitis. From hysterical tenderness and pain, by the coexistence of spinal irritation, and by the less severe constitutional symptoms. The disease, in its early stage, may be distinguished by a feeling of crepitation under the hand, and a *to-and-fro* sound on applying the stethoscope while the abdominal parietes are in motion, as in the act of inspiration.

TREATMENT.—In recent and acute cases, prompt antiphlogistic treatment, consisting of general bleeding, followed by the application of leeches and fomentations, and the internal use of tartar-emetic combined with calomel and opium in full doses, and at short intervals, so as speedily to affect the system. In very severe cases, mercurial inunction may be employed at the same time. If much irritability of stomach is present, the tartar-emetic must be omitted, and calomel and opium must be given alone. In less severe cases, leeches to the abdomen, followed by warm fomentations, and calomel and opium internally.

In chronic cases, leeches in smaller numbers, calomel and opium, and stimulant embrocations to the abdomen, of which the best is hot turpentine. If great debility be present, these

remedies must be combined with stimulants taken by the mouth, and administered in the form of enema.

When peritonitis proceeds from a penetrating wound of the abdomen, the case is formidable, though not invariably fatal.

After repeated doses of calomel and opium, castor oil may be given in a half ounce or ounce dose, and the large intestines may be relieved by enemata of warm water or warm gruel.

If there is painful tympanites or meteorism, we should employ stimulating enemata. The elastic tube should be introduced into the colon, by which the accumulated gas will rapidly escape, the diaphragm be allowed to descend, and the respiration to become free.

When effusion has taken place, and the febrile symptoms have abated, we must resort to the remedies for ascites. (See *Ascites*.)

ASCITES—DROPSY OF THE ABDOMEN.

SYMPTOMS.—A progressive and uniform enlargement of the abdomen, accompanied, when the quantity of fluid is large, by tension of the parietes; dullness on percussion over the whole abdomen when the fluid is abundant; and, when the quantity of fluid is small, over the part to which the position of the patient may cause it to subside, the rest of the abdomen being tympanitic; and a sense of fluctuation, becoming more and more distinct as the quantity of fluid increases.

The general symptoms which accompany ascites are due to the pressure exercised by the accumulated fluid, and in those cases in which ascites is merely a symptom of some other disease, to the disease in question. The symptoms arising from the pressure of the fluid are the following: difficulty of breathing; suffusion of the countenance, and injection of the eyes; and distention of the superficial veins of the abdomen. Thirst, a dry skin, scanty urine, and torpid bowels, are among the most common accompaniments of ascites.

The disease seldom continues long without inducing, or being accompanied by, an anasarca state of the lower extremities.

CAUSES.—In addition to the general causes of dropsy (see *Anasarca*), certain diseases of the viscera of the chest and belly, leading to obstructed circulation; of the liver, spleen, pancreas, or mesenteric glands; diseases of the heart or lungs; organic disease of the kidney; scarlatina; loss of tone in the peritoneum after pregnancy; atonic inflammation of the peritoneum, sometimes caused by cold; local injury.

DIAGNOSIS.—From *encysted Dropsy*, by the uniform enlargement of the abdomen, and, in recent cases, by the more dis-

tinct fluctuation; also, by the greater constitutional disturbance. From *Tympanites*, by the dullness on percussion over the seat of the fluid, or over the entire abdomen. From the *Enlargement of Pregnancy*, by the fluctuation and the absence of the characteristic signs of the pregnant state. From *Retention of Urine*, by the coexistence in this disease of constant dribbling of water.

PROGNOSIS—Favorable.—The ascertained absence of organic disease of the viscera of the chest and abdomen. The urine healthy, in quality and quantity, and not coagulating by heat; moist skin; the swelling of the abdomen diminishing; the respiration becoming free; the strength little impaired.

Unfavorable.—Organic disease of the viscera of the chest or abdomen; great emaciation; sympathetic fever; coma; an impaired constitution; previous bad habits of life.

TREATMENT.—If pain and tenderness on pressure exist, leeches to the abdomen, followed by mercury so as to affect the mouth. If both are absent, the treatment must vary with the disease, of which the ascites is the effect. If disease of the liver be present, mercury so as to affect the system, or the hydriodate of potash; if disease of the heart or lungs, offering an impediment to the circulation, the abstraction of blood from the arm according to the urgency of the symptoms and the state of the patient; if disease of the kidney, the remedies appropriate to that disease. The remedies for the dropsy itself, irrespective of the causes which may have produced it, are, blood-letting, diuretics, and drastic purgatives, unless contra-indicated by any of the existing symptoms. The class of diuretics to be preferred must depend partly upon the cause of the dropsy, and partly on the existing state of the patient.

After a fair trial has been given to those remedies which increase the natural secretions, if the pressure and tension of the abdomen become insupportable, recourse must be had to tapping of the abdomen.

In this, as in all other forms of dropsy, it is of the first importance to ascertain the causes of the dropsical effusion. This will generally consist in chronic visceral disease; and the treatment must vary with the nature of that disease.

Ascites is often combined with anasarca.

OVARIAN DROPSY—ENCYSTED DROPSY.

SYMPTOMS.—The *encysted dropsy* is seldom preceded, or in the first instance accompanied, with any cachectic state of the system; it is distinctly observed to begin in a particular part of the abdomen, whence it gradually diffuses itself throughout the whole cavity; the strength of the patient is

long unimpaired; and the appetite and respiration continue good; until the bulk and pressure of the fluid bring on various constitutional effects, which usually attend the true ascites in its early stages.

CAUSES—*Predisposing*.—Age from puberty to the termination of the period of child-bearing. *Exciting*.—Obscure.

DIAGNOSIS.—The pathognomonic symptom is the commencement on one side, and, except when the disease is of long standing, and the accumulation of fluid considerable, an unequal enlargement of the abdomen. In the early stages, fluctuation not perceptible, or less marked than in ascites.

PROGNOSIS.—Unfavorable as to ultimate recovery, but the disease may continue for years without proving fatal; sometimes it runs a rapid course.

TREATMENT.—If there is pain or tenderness over the seat of the tumor, leeches, and antiphlogistic measures, and mercury to affect the gums. Except in this case, remedies are ineffectual, and the only chances of recovery are in a spontaneous cure by rupture of the cysts, and the discharge of the contained fluid by the intestines, bladder, vagina, or parietes of the abdomen; or in an operation. This may consist in simple puncture of the tumor, as in common ascites; or in puncture of the tumor, the discharge of the fluid, and the extraction of the sac, an operation which has more than once been performed with complete success.

ANASARCA—DROPSY OF THE FLESH.

SYMPTOMS.—The disease generally commences in the lower extremities, and first shows itself toward evening with a swelling of the feet and ankles, which by degrees ascends, and successively occupies the thighs and trunk of the body. It is also often accompanied by ascites. The urine is generally small in quantity, high colored, and deposits a reddish sediment; sometimes, however, it is of a pale whey color, and more copious. The skin is generally pale and dry, and, when the effusion is in large quantity, it becomes tense and shining, and the water often oozes through the pores of the cuticle, or raises it in the form of small blisters. The other symptoms vary with the cause of the dropsy, and the diseases with which it may happen to be combined.

CAUSES—*Predisposing*.—All causes of debility.

Exciting.—Certain organic diseases, producing an obstruction to the free circulation of the blood; suppression of customary evacuations; the sudden disappearance of cutaneous eruptions; abuse of spirituous liquors; common catarrh; the exanthemata, especially scarlatina; pressure on the veins of the extremities.

DIAGNOSIS.—From *Emphysema*, by the swelling in anasarca pitting on pressure ; in emphysema, being elastic, and accompanied with crepitus. ?

PROGNOSIS.—*Favorable*.—The disease having been induced by causes which admit of easy removal ; the strength little diminished ; the constitution of the patient previously unimpaired ; the appetite remaining entire.

Unfavorable.—Concomitant organic disease ; great debility and emaciation.

TREATMENT.—The treatment of anasarca must vary with the cause. If it depend upon visceral disease, the treatment will be appropriate to that disease ; if upon pressure, the compressing cause must be removed ; if upon an inflammatory state of system, bleeding and other antiphlogistic remedies will be required.

Anasarca following scarlatina is of the inflammatory kind, and is generally accompanied by coagulable urine, and is best treated by bleeding, depressing diuretics, and drastic cathartics. In this form of dropsy, as in all others, the urine must be examined to ascertain the presence or absence of disease of the kidney. (See Diseases of the Kidney.)

[The treatment of dropsy following scarlet fever is a subject demanding great attention on the part of the physician, from its great obstinacy and frequently fatal termination. One of the most efficient measures is bleeding from the arm, if the disease does not exhibit some tendency to mitigation upon the use of diuretics. Next to venæsection is the application of leeches over the seat of the kidneys, from the bites of which the flowing of blood should be encouraged for an hour or two, according to the age and strength of the child. In infants all the blood required to be taken by leeches should be taken at once, without the application of any moisture and warmth.]

If, in spite of remedies, the anasarca increases and the legs are so swollen as to require immediate relief, the fluid must be let out by repeatedly introducing a common curved needle under the skin, and subsequently keeping up a uniform pressure by bandages.

CHAPTER VI.

DISEASES OF THE URINARY ORGANS.

1. Diseases of the Kidney.
2. Diseases of the Bladder.

DISEASES OF THE KIDNEY.

NEPHRITIS Inflammation of the Kidney.

GRANULAR DISEASE OF THE KIDNEY.

GRAVEL.

URINARY CALCULUS.

HÆMATURIA Bloody Urine.

ISCHURIA RENALIS Suppression of Urine.

DIABETES Immoderate flow of Urine.

NEPHRITIS—INFLAMMATION OF THE KIDNEY.

SYMPTOMS.—Pyrexia ; pain in the region of the kidney, extending along the course of the ureter to the neck of the bladder, to the groin or scrotum, and frequently attended by retraction of the testicle. The pain is deep-seated, circumscribed, or diffuse, acute or dull, sometimes only felt upon pressure, but always increased by firm pressure, by the erect or sitting posture, by coughing, sneezing, or other strong expiratory movements, and sometimes even by the descent of the diaphragm in ordinary respiration. It is also increased by straightening or stretching the lower extremity on the affected side. Instinct directs the patient to avoid this ; to incline to the affected side, and to bend the limb, thereby relaxing the muscles of the loins. Hence he lies on the affected side, or back, and draws up one or both lower extremities. Nausea and vomiting ; frequent micturition ; dysuria, with partial or total suppression of urine. The urine which is passed is usually, at first, bloody, and coagulable by heat and acids, but after a time the blood disappears, and the urine becomes pale, watery, not coagulable, and either neutral or alkaline. Albumen is, however, sometimes present, but in those cases the inflammation is probably complicated with granular degeneration of the kidney. The pulse is full, hard, and frequent at first, but becomes small as the disease advances ; the tongue is covered with a white fur ; there are constipation, tympanites, and wandering pains in the abdomen, with an anxious expression of countenance and depression of spirits.

TERMINATIONS.—In resolution ; in abscess ; or in gangrene ;

known by the ordinary symptoms that accompany these terminations of inflammation in other parts. Coma is one of the most common terminations.

MORBID APPEARANCES.—On examining an inflamed kidney, we find it of a scarlet or crimson color; sometimes enlarged, indurated, or infiltrated with pus. The ureters in such cases participate in the disease; they are red, their mucous membrane thickened, and covered with pus; or adherent, so that their canal may be obliterated in some part of its course, above which the tube will be enlarged. This last appearance is often seen when a calculus is passing from the kidney to the bladder, and when it obstructs the ureter.

CAUSES.—The common causes of inflammation; acrid diuretics; calculi or gravel in the uriniferous tubes, ureters, or bladder; external injury; long-continued and violent exercise of the muscles of the back, as in horse exercise; collections of hardened feces in the colon; retrocedent or atonic gout; diseases of the urethra, prostate gland, bladder, and ureters.

DIAGNOSIS.—From *Lumbago*, by the seat of the complaint, discovered upon pressure; by the pain following the course of the ureter; by the dysuria and micturition; by the retraction of the testicle; by the pain not being increased upon motion of the muscles.

PROGNOSIS.—*Favorable*.—Remission of pain, fever, and tension, followed by a very copious excretion of high-colored urine, mixed with mucus or pus; universal equable perspiration; hæmaturia, if succeeded by a remission of symptoms. The prognosis is generally favorable in idiopathic nephritis before the fifth day.

Unfavorable.—Urine secreted in small quantity; very frequent micturition; dysuria; severe rigors, and supervening hectic fever; sudden cessation of pain; hiccough; delirium; cold extremities.

It sometimes happens that nephritis is unaccompanied by pain in the kidney, while the stomach, the brain, or the bladder may exhibit all the signs of idiopathic disease.

TREATMENT.—*Indications.*—The same as in the other phlegmasiæ.

They are to be fulfilled by,

1. General and local blood-letting; the latter either by the use of cupping-glasses, or by the application of numerous leeches to the region of the kidney or perinæum, followed by opiates.

2. Oleaginous cathartics of castor oil, manna, or oil of almonds; frequent emollient clysters.

3. Mild diaphoretics, especially frequent and copious draughts of mucilaginous and diluent liquids, as barley-water, solution

of gum arabic, decoction of marsh-mallows, linseed-tea, with a little nitre.

4. When the fever is somewhat abated, and the pain excessive, clysters of starch and laudanum (ʒi. to Oss.).

5. The warm hip bath, repeated according to the violence of the pain; and fomentations to the region of the kidney.

6. Anodyne embrocations, as the camphorated oil and morphia, applied over the region of the kidney when the acute symptoms have abated, may be tried with advantage. An issue or seton should be inserted in chronic cases. In dyspeptic subjects, the tonic bitter infusions. The alkalies, as soda, potass, and lime-water, are useful when the urine is acid, and the mineral acids when it is alkaline.

The treatment of nephritis differs very little from that of enteritis, with the exception of the use of blisters. These are generally considered as improper, because they frequently induce strangury, which mostly increases the inflammation of the kidney.

REMEDIES.—In chronic cases, a decoction of the dried leaves of the amygdalus Persica, olive oil, uva ursi, pareira brava, and balsam of copaiba.

In the treatment of acute nephritis, Dr. Christison recommends bleeding carried to syncope, followed by opium in the dose of two or three grains, or thirty or forty minims of the tincture. He has seen the disease “abruptly arrested in this way.”—(Libr. Pr. Med., vol. x.) It is important to direct the treatment, not to individual symptoms, but to the inflammation which causes them. Perfect rest should be enjoined, and during convalescence all violent exertions should be avoided. When there is retention of urine, it is important to make use of the catheter at stated periods.

GRANULAR DISEASE OF THE KIDNEY.

SYMPTOMS.—The disease may be acute or chronic. The acute is ushered in by rigor followed by pyrexia. The urine is scanty or almost suppressed, occasionally bloody, and loaded with albumen; there is frequent micturition, dull pain in the loins, sometimes shooting to the groins or testicles; nausea, pain in the epigastrium increased by pressure, and in some cases, vomiting. These symptoms are followed in one or two days by anasarca.

The terminations of the disease are various: sometimes it yields to active treatment; in other instances it subsides into the chronic form; in others, again, it leads to acute visceral disease, such as pleurisy, pericarditis, peritonitis, or pneumonia. In those cases where the urine is very scanty, it frequently terminates in fatal coma.

The chronic form may commence with acute symptoms, or it may come on gradually and imperceptibly, the first marked symptoms being frequent micturition and debility. The patient also complains of obscure pains in the loins, increased by pressure; the urine scanty or increased in quantity, of a cherry-red or brown color, or of a muddy appearance, of low specific gravity, and coagulating more or less by the action of heat and nitric acid; the skin is dry, and there is nausea with urgent thirst. In this state the patient may remain for many months, or even for a few years, till at length some of the secondary disorders make their appearance. The most common of these are dropsy, acute and chronic visceral inflammation, diarrhœa, rheumatism, catarrh, diseased heart, and coma. When the disease proves fatal, death is usually preceded by coma.

DIAGNOSIS.—Of the *acute* form.—“The only invariable character is scanty, highly-coagulable urine, with more or less fever.” Of the *chronic* form.—“A reduction in the density of the urine, with diminution of its solids; excessive reduction of the coloring matter of the blood; and leucophlegmasia.”—(Christison.)

COMPLICATIONS AND TERMINATIONS.—Anasarca and ascites; bronchitis, diarrhœa, dyspepsia, constant vomiting; pleurisy, peritonitis, pericarditis, pneumonia; coma; chronic rheumatism; and organic diseases of the heart and liver.

PROGNOSIS.—Complete recovery rare. *Favorable.*—The early stage or previous rare occurrence of the disease; absence of complications; gradual disappearance of albumen from the urine, and its increasing specific gravity; moisture of the skin. *Unfavorable.*—The reverse of these; suppression of urine; coma.

ANATOMICAL CHARACTERS.—Various alterations in the size and structure of the kidneys, of which the following seven varieties are enumerated by Christison: 1. Congestion of the kidney with enlargement, and with or without deposition in its internal structure; 2. A granular deposition into its cortical and tubular textures, sometimes finely granular, sometimes roe-like, and attended with atrophy or absorption of the proper renal tissue; 3. Deposition of a homogenous yellowish-gray matter, with similar atrophy; 4. Disseminated tubercles; 5. Induration of semi-cartilaginous hardness; 6. Atrophy, from disappearance of the proper renal structure, with little or no deposition; and, 7. Mere anæmia, or paleness?

The essence of this disease, according to Dr. George Johnson, is an increase in the quantity of fat naturally existing in small proportion in the epithelium cells lining the urinary tubules. Bright's disease, therefore, must be regarded as a

fatty degeneration of the kidney, bearing a close analogy with the fatty liver, with which, as well as with fatty deposit in the coats of the arteries, and on the valves of the heart, it is often found associated. The various appearances presented by the diseased kidney are due to the extent, rapidity, and duration of the morbid changes.

CAUSES.—*Predisposing*.—The scrofulous diathesis. It occurs in both sexes, and at all ages; at 5, and even under, and so late as 79.—(Christison.) Of seventy-four fatal cases recorded by Dr. Bright, nineteen were under 30, fifty under 50, thirteen above 50, and four above 60. *Exciting*.—The impure air, and other unwholesome influences to which the poor inhabitants of large towns are exposed; intemperance; mechanical injuries; cold. Scarlatina?

DIAGNOSIS.—In the early stage of the disease, the urine, when examined under the microscope, is found to contain a large quantity of epithelial cells loaded with fat; in advanced stages of the disease, the urine is albuminous.

TREATMENT.—The indications for treatment laid down by Dr. George Johnson are the following: I. The pursuance of a general tonic regimen in respect of diet, atmosphere, exercise, and medicine. II. The careful avoidance of all exhausting remedies. III. To avoid, as articles of food, fat and other highly-carbonized materials, &c. IV. To relieve congestion of the gland by strict attention to the functions of the skin and bowels, and by such small blood-letting as circumstances may demand.

In acute cases, when fever is present, bleeding; and if there is severe pain in the loins, cupping. The dropsical effusions must be removed by purgatives and diaphoretics, diuretics being inadmissible. In the absence of diarrhœa, drastic purgatives, as full doses of the compound jalap powder, may be given at the same time with Dover's powder, in five or ten grain doses two or three times a day; and a hot-air bath may be administered at intervals of one, two, or three days. The skin should be kept warm, and a nourishing but unstimulating diet should be prescribed.

When there is much debility, tonics or stimulants may be prescribed. A good stimulant diaphoretic, in such cases, is the liq. ammon. acet. in doses of an ounce, three or four times a day.

In the treatment of complications, the nature of the existing disease of the kidney must be borne in mind, and the remedies appropriate to those complications, modified by the existing disease and state of system, must be prescribed.

REMEDIES.—Mercury? The abstinence from fat and oily substances, and from articles containing starch and sugar.

PROPHYLAXIS.—Temperance, pure air, a clean skin, plain

and wholesome diet, and regular exercise in the open air, are particularly to be enforced in persons who have suffered, or seem liable to suffer, an attack of this disease.

GRAVEL.

SYMPTOMS.—Dull or acute pains, with a sense of heat and heaviness in the lumbar region, with more or less pain or difficulty in voiding the urine, increased by sudden and violent motion, with occasional pain behind the pubes, irritation at the neck of the bladder, and itching or pain at the extremity of the penis. Sometimes there is retraction of the testicles, with discharge of bloody urine or of clots of blood. The urine, even while warm, contains a sandy powder, crystalline grains, or small calculi. It is generally rather scanty, high colored, of high specific gravity, acid, of a strong odor, and disposed to become turbid on cooling. The digestive organs are deranged; there is a sense of weight in the epigastrium; acidity of the stomach, with flatulence; frequent eructation; constipation; furred tongue; dry skin; restlessness; and feverishness.

The most common form of gravel consists of lithate of ammonia, with or without free lithic acid. Next to this, in point of frequency, is pure lithic acid. The ammoniaco-magnesian phosphate, or a mixture of this with phosphate of lime, comes next in order; then the oxalate of lime. A mixture of these several sorts is not of uncommon occurrence. The other forms of gravel are rarely met with. For the mode of distinguishing these several varieties, see sec. 333, et seq.

CAUSES.—*Predisposing.*—Constitutional and hereditary peculiarities; the periods of infancy, and from the age of forty upward; high living; sedentary habits; gouty diathesis. *Exciting.*—Cold; blows and injuries to the loins; dyspepsia; the use of water containing calcareous matters; acescent fruits. In the case of the oxalate of lime gravel, an excess of saccharine matters, and vegetables and fruits containing oxalic acid; organic disease of the kidney or bladder.

TREATMENT.—This varies with the species of gravel discharged. In the lithic acid gravel, a diet chiefly vegetable, and in extreme cases strictly so; diluents; the alkaline bicarbonates, as the bicarbonate of soda, in ten-grain doses, three or four times a day; gentle exercise, and a regular state of the bowels. The alkaline aerated waters, as those of Vichy, Carlsbad, Vals, Biln, and Tarasp, are highly beneficial in this form of gravel.

When the phosphates are deposited, a more generous diet is admissible, and the mineral acids, properly diluted, should be given at short intervals. The same attention is also required to the state of the digestive organs, and to the general health.

In the oxalic acid gravel the alkaline carbonates are required. All articles of food containing oxalic acid should be avoided, and saccharine substances should be taken in moderation, or, in extreme cases, disallowed. Dr. Prout recommends muriatic acid, and has found it advantageous.

In all forms of gravel, strict attention must be paid to the general health; to the functions of the skin; to the avoidance of sudden changes of temperature; and to the state of the digestive organs. Symptoms supervening on gravel must be treated by the remedies appropriate to such symptoms occurring independently of it. Thus, in addition to the treatment of acute and chronic nephritis and other diseases of the kidney already described, it will be sometimes necessary, in cases of gravel, to employ leeching, fomentations, warm baths, mucilaginous drinks, enemata, and low diet; and to enjoin rest of body and tranquillity of mind.

URINARY CALCULI.

SYMPTOMS.—These will vary with the situation of the calculi. When they are situated in the bladder or urethra, the case comes under the care of the surgeon; but when they are contained in the kidney or in the ureter, they are beyond the reach of surgical aid, and require medical treatment.

The symptoms of *calculi in the kidney* are those of gravel in its most severe form, or of nephritis, viz., pain in the loins, extending to the groin, testicle, or extremity of the penis, retraction of the testicle, painful and frequent micturition, and bloody urine. The pain is greatly increased by motion, and relieved by rest. There are nausea and vomiting, restlessness, and slight fever. These symptoms are often suddenly removed by the discharge of a small calculus, often accompanied or followed by that of a large deposit of gravel. The presence of this calculus in the kidney often leads to severe inflammation, and to those diseases of the kidney which are the result of it.

TREATMENT.—That of gravel. The alkaline bicarbonates, much diluted, and with an excess of carbonic acid, form here, as in the case of gravel, the most important remedy. The remainder of the treatment will depend upon the nature of the symptoms.

The symptoms of *Calculus in the Ureter*.—When a calculus is passing along the ureter, there will be intense pain or colic, or a dull pain along the affected ureter and spermatic cord on the same side, extending to the penis, the testicle, or the inside of the thighs. There is frequently great tenderness on a circumscribed spot of the abdomen, corresponding with the seat of the calculus. The patient is troubled with constant

and often ineffectual calls to pass urine, which is tinged with blood. There are severe nausea and vomiting, with extreme anxiety and intense suffering. These symptoms may pass off suddenly, and in this case a small calculus is sometimes discharged from the urethra. In other instances the calculus remains impacted in the ureter, leading to disease of the kidney, or giving rise to large accumulations of urine, and ultimate distention of the pelvis of the ureter, and of the walls of the kidney. In this manner the kidney may be transformed into a kind of sac, which may fill the abdomen, contain an immense quantity of urine, and be mistaken for ascites.

TREATMENT.—A full dose of opium, laudanum, or morphia, or an opiate enema, or suppository (ʒi. of laudanum or two or three grains of opium). The warm bath, with fomentations on the abdomen and loins, and, if the nephritic pain or colic is violent, venæsection and leeches.

Calculus in the bladder is consigned to the surgeon, and relieved by the operations of lithotritry and lithotomy. The urgent symptoms caused by it will require the same plan of treatment as chronic nephritis or gravel.

HÆMATURIA—BLOODY URINE.

SYMPTOMS.—An evacuation of urine, mixed with blood, preceded, when not the effect of injury, by pain and sense of weight in the loins; pain and heat in the region of the kidney.

CAUSES.—It is most frequently symptomatic of other renal affections, especially of inflammation of the kidney, of some forms of Bright's disease, of calculus, of diseased prostate, and more rarely of a diseased state of the mucous membrane of the bladder. It may also arise from external violence or great exertion. It may be produced by any of the causes of hæmorrhage, or by excessive venereal indulgence. Sometimes, also, it occurs in the course of purpura nautica, or purpura hæmorrhagica; and at the close of severe febrile affections, accompanied by typhoid symptoms. A discharge of blood from the urethra is not an uncommon event in young inhabitants of the Mauritius.

DIAGNOSIS.—Bloody urine is distinguished by its color, the characteristic deposit, and the effect of heat and acids.

TREATMENT.—The treatment must be determined by the existing complications, or probable causes of the hæmorrhage. If the disease be the consequence of injury, or the patient be of a full, plethoric habit, bleeding, or cupping to the loins; aperients; astringents, such as the infusion of roses with an additional quantity of sulphuric acid; uva ursi; pareira brava; acetate of lead with opium; tinctura ferri muriatis; gallic acid; Ruspini's styptic.

If it arise from irritation of the kidney by calculus, together with the remedies proper for that disease, frequent draughts of mucilaginous liquids, as thick barley-water, solution of gum acacia, decoction of marsh-mallows, sweetened with honey; opium; copious emollient clysters.

If the blood coagulates in the bladder, it gives rise to difficult micturition, and requires the use of the catheter. In such cases, the injection of warm water, decoction of marsh-mallows, or of poppies, by means of the double syringe, or a gum-elastic bottle, is productive of great benefit.

ISCHURIA RENALIS—ANURIA—SUPPRESSION OF URINE.

SYMPTOMS.—Languor, restlessness, a sense of weariness and weight in the loins and lower extremities, frequent pulse, heat of skin, flushed face, headache, nausea, and vomiting. These symptoms are followed about the third day by drowsiness, œdema of the face, or of the limbs and entire body. About the fourth day, coma sets in, and death takes place in two or three days more. At the onset of the disease, the bladder is found to contain a small quantity of muddy urine; but when the disease is fully formed, there is complete suppression.

In some cases, the kidney continuing to secrete urine, the bladder is empty from some mechanical obstruction to the passage of the secretion through the ureters.

CAUSES.—Pre-existing disease of the kidney, excited into activity by blows or falls, or exposure to wet and cold. The action of certain poisons, as digitalis, corrosive sublimate, and cantharides. Acute inflammation of the kidney.

DIAGNOSIS.—From retention of urine by the empty state of the bladder as ascertained by the hand, and by the use of the catheter.

PROGNOSIS.—The disease is generally fatal if it does not soon yield to the remedies employed.

TREATMENT.—In acute disease, without previous signs of organic disease of the kidney, blood-letting, opiate diaphoretics, as Dover's powder in full doses, the warm bath, purgatives, and purgative enemata. When the kidneys have been previously diseased, cautious local depletion, with purgatives and diaphoretics, must be preferred to more active measures. When coma has set in, the disease is generally beyond the reach of remedies.

DIABETES—IMMODERATE FLOW OF URINE.

SPECIES.—1. *Diabetes insipidus*; with limpid urine, not sweet.

2. *Diabetes mellitus*; with urine of the smell, color, and taste of honey.

3. *Diabetes chylosus*; urine containing chyle.

DIABETES INSIPIDUS.

SYMPTOMS.—Emaciation, debility, depression of spirits, anxious expression of countenance, thirst, gnawing sensations at the stomach, dyspepsia, white tongue, constipation, dry skin, irritable bladder, greatly increased secretion of urine.

The urine does not always present the same properties. In some cases there is merely an increase of water, the other constituents retaining their normal proportion; in others the urea is in defect; and in a third class of cases, in excess. To these three forms of diabetes insipidus (or, to speak more correctly, non-saccharine) Dr. Willis has given the names *Hydruria*, *Anazoturia*, and *Azoturia*. In the first and second variety the urine is of very low density (in one case of the first form 1001.—Christison); in the third variety the density is high (commonly 1030 to 1035, but sometimes as low as 1020 to 1024).

CAUSES.—Excessive use of liquids, especially of spirituous liquors; hysteria; nervous excitement; granular disease of the kidney; irritation or disease of the bladder or urinary passages. The third variety is not uncommon in young children.

PROGNOSIS.—*Unfavorable* when combined with disease of the kidneys. In other cases, it frequently yields to judicious treatment.

TREATMENT.—Moderate use of liquids; abstinence from all substances which possess a diuretic property; tonics, especially the mineral acids, and opium; diaphoretics, warm clothing, the warm bath; a nutritive diet. In the second form of the disease, a due proportion of animal food is necessary; but in the third, the diet should consist chiefly of vegetables. Occasional symptoms must be treated by appropriate remedies; when excitement of the circulation is present, moderate bleeding; when great restlessness, opium; in extreme debility, tonics or stimulants; if there is much irritability of the neck of the bladder, demulcents.

DIABETES MELLITUS.

SYMPTOMS.—The first symptom which attracts attention is frequent micturition. The urine, on being examined, is found excessive in quantity, of a pale color, wanting its proper odor, and containing sugar in greater or less quantity. There is inordinate appetite, generally accompanied by dyspeptic symptoms; excessive thirst; constipation; the tongue is clammy, and red at the edge, or clean, or white with a brown streak down the middle; the gums are red and tender; the throat dry; the breath has often a sweetish odor like that of hay; the skin is dry, harsh, and scaly; debility; and rapid emaciation. The mind is generally affected, the power of attention being weakened, and the disposition being rendered melan-

choly, anxious, and irritable. After the disease has continued for some months, or even for several years, the symptoms continuing to increase, the patient either dies exhausted, or falls a victim to some organic disease.

DIAGNOSIS.—From other forms of diabetes, by the saccharine quality of the urine. The other properties of the urine are thus described by Dr. Christison: "In the earliest period, it is not improbable that the urine is characterized by being above 1030 in density, high in color, and abounding in urea as well as other natural ingredients. Most generally, when first carefully attended to, it is found very pale, scarcely urinous in its odor, little prone to become ammoniacal when long kept, high in density, excessive in quantity, defective in the proportion of urea, but not in its daily quantity; defective also in its proportion of earthy salts, and abounding in sugar, which communicates a sweet taste, and the property of fermenting with yeast. Should the case, however, have been previously for some time under proper treatment, then the color of the urine is often less pale, its odor somewhat urinous, and, under long keeping, ammoniacal; its quantity is not so excessive, yet still always superabundant, especially considering its high density; the proportion of urea more abundant, its daily quantity excessive; and sugar also present, though frequently it is not to be detected by the sense of taste. As the disease advances, the influence of the treatment here laid down ceases to be so manifest; and less favorable characters previously mentioned recur; and not unfrequently there is also some albumen, which may be separated by coagulation with heat. Lastly, toward the close, where death does not arise from immediate or secondary disorders, the natural condition of the urine is often observed to be restored for a week, or even upward; the quantity, color, odor, and density being much the same as in health, the urea in the natural proportion, the sugar wanting, and the chief deviation observed from ordinary urine being, that putrefaction ensues with unusual speed." For the mode of detecting sugar in the urine and of ascertaining its quality, see Part I., sec. 330.

ANATOMICAL CHARACTERS.—The kidneys generally larger than in health, gorged with blood, flabby, with all the vessels and ducts enlarged. Granular degeneration is sometimes found as a complication.

COMPLICATIONS AND SECONDARY DISORDERS.—Tubercular phthisis is the most common complication; granular degeneration of the kidney; peritoneal inflammation; anasarca; apoplexy.

PROGNOSIS—*Favorable*.—Short previous duration of the dis-

ease, urine not exceeding 12 pints in quantity and 1036 in density, the emaciation not considerable, the appetite and thirst not inordinate, the skin still perspirable, and the mind not much depressed. When the patient is under treatment, the signs of improvement are, diminution of the quantity of the urine, without increase, or with diminution, of density, steady diminution in the quantity of solids discharged by urine, increase of weight, diminished appetite and thirst, the skin becoming softer, the eye brighter, the mind clearer and more cheerful, and the body stronger and more active.

Unfavorable.—Prolonged duration of the disease, great emaciation, prostration of strength, urine profuse and of high density, the solids discharged greatly exceeding the solids contained in the food, intense thirst, inordinate craving for food, the supervention of other diseases, great and sudden prostration of strength.

CAUSES—*Predisposing.*—Hereditary predisposition. *Exciting.*—Cold; drinking cold water when the body is heated; intemperance.

TREATMENT—*Indications.*—I. To diminish, as much as possible, the sources whence sugar can be supplied to the urine. II. To diminish the secretion of urine. III. To relieve urgent symptoms.

I. The first indication is fulfilled by a strict regulation of the diet, which should consist principally of animal food, broiled or roasted, with a small quantity of stale and well-fermented bread (16 ounces of bread and 20 ounces of uncooked meat.—Christison), and liquids in moderate quantity: of these, the best are weak beef or mutton tea, milk, pure spring water, or water holding calcareous salts in solution. These should be taken in small quantities at a time, and warm. Gluten bread may be substituted with advantage for common bread.

II. The second indication is answered by reducing the quantity of liquids, by forbidding the use of tea, of spirituous liquors, of acidulated drinks, and of saline aperients; in fact, of all articles of diet or medicine which have diuretic properties; by increasing the secretion of the skin, by warm baths, Dover's powder, frictions, and warm clothing; by opium in full doses, which medicine diminishes the secretions generally, and at the same time calms existing excitement; and by astringent remedies, as sulphate of zinc and acetate of lead.

III. When there is much fever present, blood-letting may be had recourse to; dyspepsia must be treated by remedies appropriate to that affection (see Dyspepsia); pain in the epigastrium may be relieved by a few leeches; anasarca may be treated by drastic purgatives; affections of the chest by

local depletion, counter-irritation, and sedative expectorants ; constipation by resinous purgatives ; and debility, when it is extreme, must be met by tonics and stimulants. A great variety of remedies has been recommended for the cure of diabetes, but the foregoing are those most approved. Bleeding has been recommended by Dr. Watt as a leading remedy, and has been carried to a much greater extent than by most authors who have treated of this disease.

DIABETES CHYLOSUS.

SYMPTOMS.—These sometimes resemble those of diabetes mellitus ; at others they are very slight, and the patient suffers little inconvenience. The urine is generally abundant, of a milky appearance, and varying in density from 1010 to 1020. A short time after its discharge, it sometimes coagulates into a white gelatinous substance, and, after a longer interval, separates into a clear yellowish fluid and a white clot ; at other times a white flaky matter is deposited, or a white cream rises to the surface. The substance which gives this character to the urine approaches in its properties those of fibrin or casein. The disease is of rare occurrence, and of slight importance.

CAUSES.—Obscure. Luxurious living, cold, fatigue, mercury, and long residence in hot climates have been mentioned among the causes.

TREATMENT.—Does not admit of removal ; but it may be palliated by blood-letting, spare living, diaphoretics, anodynes, and laxatives.

DISEASES OF THE BLADDER.

CYSTITIS	Inflammation of the Bladder.
ENURESIS	Incontinence of Urine.
DYSURIA	Difficulty in voiding the Urine.

CYSTITIS—INFLAMMATION OF THE BLADDER.

SPECIES.—1. Cystitis acuta ; 2. Cystitis chronica.

SYMPTOMS.—Pyrexia, acute pain, swelling and tension in the region of the bladder ; pain and soreness, increased upon pressure, above the pubes, or in the perinæum ; frequent micturition, painful discharge of urine, in small quantities ; or complete obstruction to its passage ; tenesmus ; vomiting.

In the chronic form, the mucous membrane of the bladder, by repeated or continued irritation, produced by calculus, by stricture, by disease of the prostate, kidneys, or other causes, has become thickened, indurated, ulcerated, and pours out a large quantity of mucus and pus, which, added to the urine,

gives to it the appearance of whey. There is often a discharge of blood.

CAUSES.—Mechanical injury; falls on the abdomen when the bladder is distended; local irritation by calculi; the inflammation of gonorrhœa extended along the urethra; spasmodic or permanent stricture; all the usual causes of inflammation; cantharides; stimulant urethral injections.

TREATMENT.—The *indications* in the *acute* species are the same as in the other phlegmasiæ, and are to be fulfilled nearly in the same way:

1. By general and topical blood-letting, and by the application of leeches to the perinæum and region of the pubes.
2. By oleaginous purges and emollient clysters.
3. The warm bath and fomentations.
4. The exhibition of opium with diaphoretics.
5. The other means recommended in nephritis.

In the *chronic species*, stimulants, as the uva ursi, cubebs, copaiba, black pepper, &c., and injecting the bladder with emollient decoctions.

Chronic disease of the bladder may depend on fungus or ulceration of the organ, on stricture at its neck, on disease of the prostate gland, ureters, or kidneys; and when it attacks aged persons, and especially if intemperate, it often proves fatal. When persons above the age of fifty are infected with blenorragia, or, as it was formerly termed, gonorrhœa, the inflammation frequently extends along the whole urethra to the neck of the bladder, and to the mucous membrane of the organ. Such persons complain of pain in the loins, bladder, and urethra, suffer intense pain, and are frequently destroyed by acute or chronic inflammation of the bladder, or some other portion of the urinary organs.

Emollient or slightly stimulating injections, varying in quantity, according to the capacity of the bladder, should be passed into it, by means of an elastic gum bottle and catheter, twice a day. Civiale, Costello, and Heurteloup prefer decoction of marsh-mallows with landanum. It is important that the feet be kept warm. For the symptoms and treatment of spasm of the bladder, irritable bladder, diseased prostate, stricture of the urethra, &c., consult works on surgery.

ENURESIS—INCONTINENCE OF URINE.

Incontinence of urine may arise from mechanical causes, or from functional derangements of the bladder. The former class of cases falls under the care of the surgeon; the latter may be cured by medicines, and therefore comes within the province of the physician.

Incontinence of urine, without organic defect, may arise

from one of two causes : from violent contraction of the muscular coat of the bladder, the sphincter possessing its usual power ; or from debility of the sphincter, the muscular coat of the bladder contracting with its usual force. In the first case there is generally some source of irritation within the bladder itself ; but in rare instances the muscular fibres are thrown into a state of spasm without obvious cause. The first form of disease is most common in males, the second in females and young children.

TREATMENT.—In incontinence of urine arising from spasm of the muscular coat of the bladder, the most effectual remedies are narcotics or sedatives, administered by the mouth, or introduced into the rectum, in the form of suppository or enema. A grain of solid opium as a suppository, or half a drachm of laudanum in a starch injection, will generally succeed in relieving the spasm. In severe cases, the warm bath, cupping to the loins, or counter-irritants, must be resorted to.

In incontinence of urine arising from debility of sphincter (a form of disease which is common in young children, leading to frequent micturition in the day, and an involuntary discharge of urine at night), two or three drops of tincture of cantharides, with ten drops of tincture of hyoscyamus, increased gradually and cautiously, rarely fails of removing the disease. (I have had several cases of this kind, which have received immediate benefit, and a speedy cure, from this mode of treatment. In one case, occurring in a young adult, after cantharides had failed, *tinctura ferri muriatis*, in the dose of ʒss. three times a day, effected a speedy cure.—G.)

When the urine is perfectly retained during the day, and voided only at night, the disease is rather the effect of habit or sloth, or the result of dreams, than of any debility of the sphincter muscles ; and here it may be necessary to resort to other means ; such as obliging the child to leave its bed about midnight for the purpose of emptying the bladder, preventing him from drinking liquid in the evening, threatening punishment, or, if all other means fail, keeping up pressure upon the urethra by means of a bougie bound along the under part of the penis.

DYSURIA—DIFFICULTY IN VOIDING THE URINE.

Dysuria may exist in every degree, from slight and momentary arrest of the flow of urine, with or without pain, to complete retention. Some degree of pain generally attends the abortive attempts to discharge the urine, and, in severe cases, the suffering is intense. The causes are very numerous ; such as acrimony of the urine itself, or irritation or inflammation of the coats of the bladder, whether originating in

the bladder itself, or from causes external to it. Thus, dysuria is one of the symptoms of gonorrhœa, of inflamed prostate gland, of gravel, of urinary calculus, of cystitis, and nephritis, of inflamed hæmorrhoids, of inflammation of the rectum, or irritation of it by worms, or scybala, of uterine affections, of pregnancy, &c. *Strangury*, an aggravated form of dysuria, is produced by cantharides and other strong irritants. Dysuria is also a symptom of hysteria, and is apt to occur in nervous persons of both sexes. Mechanical impediment to the passage of urine through the urethra, as in stricture, also occasions dysuria.

TREATMENT.—This must depend on the cause. Mechanical obstructions must, for the most part, be removed by mechanical means; existing causes of irritation, whether within the bladder or external to it, must be removed; inflammation, where it exists, must be subdued; and the spasmodic action of the muscles must be relieved by narcotics and sedatives.

Among the causes of dysuria, which are external to the bladder, constipation is the most common; and a brisk purgative, or a proper course of aperients, will soon remove the disease.

When there is spasm of the muscular coat, it will be necessary to employ the warm bath and opiate suppositories or enemata. The tincture of the muriate of iron, in repeated doses, and the cold affusion to the pelvis and thighs, are also powerful remedies where spasm is present.

When the urine is scanty and acrid, diuretics and diluents will be required. Dysuria following long retention of urine is best relieved by the warm bath.

CHAPTER VI.

DISEASES OF THE FEMALE ORGANS OF GENERATION.

AMENORRHŒA	Suspended Menstruation.
DYSMENORRHŒA	Painful Menstruation.
MENORRHAGIA	Excessive Menstruation.
LEUCORRHŒA	The Whites.
HYSTERALGIA	Irritable Uterus.
METRITIS	Inflammation of the Uterus.

AMENORRHŒA—SUSPENDED MENSTRUATION.

SPECIES.—1. Amenorrhœa with plethora; 2. Amenorrhœa with anæmia or chlorosis.

AMENORRHŒA WITH PLETHORA.

The general symptoms are those of plethora, and the con-

stitutional treatment that which is recommended under that head. (See Plethora.) When blood is abstracted, it should be taken away at the approach of the menstrual period.

AMENORRHŒA WITH ANÆMIA OR CHLOROSIS.

For a description of the constitutional symptoms and treatment of anæmia and chlorosis, see those diseases. Amenorrhœa may be the cause or the consequence of constitutional debility, or, perhaps, to speak more correctly, the suspension of the menstrual discharge is in some cases the first of the train of symptoms constituting those diseases, while in other instances it makes its appearance where symptoms of debility have already existed for a considerable period. In either case the existing malady is strongly indicated by the appearance of the countenance, which is either pale and transparent, as if from mere loss of blood, or waxen, sallow, and muddy, as in well-marked chlorosis. In the first case the general symptoms are those of debility and languid circulation; in the latter, of debility, with a cachectic state of the constitution; in the first form the secretions are but little deranged, in the last they deviate more widely from their natural character. Hence the former class of cases will be found to require a less careful attention to the state of the secretions than the latter; steel is necessary in both, but purgatives and alteratives will often be unnecessary in anæmia, while they will be as strongly indicated in chlorosis. In addition to the general treatment laid down under those heads (see Anæmia and Chlorosis), it may be necessary to prescribe measures for the restoration of the menstrual discharge. The principal of these measures are, the warm hip bath at the expected period, aloetic purgatives, electricity, and the remedies styled emmenagogues, of which the chief are savine, hellebore, ergot of rye, and strychnine. Leeches are also applied to the vulva, groins, or breasts, at the menstrual period, with the same view.

Amenorrhœa is sometimes accompanied by vicarious discharges of blood, or of blood slightly altered from its usual character, from the nose, lungs, stomach, or rectum, and from ulcers of the skin. These vicarious discharges, if occurring in important organs of the economy, may require medical interference, and are best treated by blood-letting and purging practiced a little before the expected period of their occurrence.

The *complications* of amenorrhœa, which are extremely numerous, must be treated by remedies appropriate to those complications, combined with such as restore strength to the system, and tend to re-establish the menstrual discharge.

DYSMENORRHEA—PAINFUL MENSTRUATION.

SYMPTOMS.—Pain in the loins preceding the menstrual period by a few hours or days ; tenderness on pressure in the hypogastric region, and sometimes over a considerable extent of the abdomen ; sense of soreness or acute darting pains, resembling those of colic, and occurring mostly in paroxysms ; vomiting ; diarrhœa with tenesmus ; dysuria. The nervous system is generally more or less affected, and hysteria in a variety of forms is often present. These symptoms increase in severity until the appearance of the menstrual discharge, and then suddenly cease or gradually pass off. The discharge is often, but not always, scanty, and is sometimes accompanied by a tenacious secretion, which takes the shape of the internal surface of the uterus.

CAUSES—*Predisposing.*—Plethora ; the nervous temperament. *Exciting.*—Sudden and violent emotions ; increased determination of blood to the uterus ; sexual intercourse immediately before the expected flux ; all causes which diminish the discharge ; irritation from neighboring parts, as constipation, which is a very frequent concomitant and cause ; spinal irritation.

PROGNOSIS—*Favorable.*—The majority of cases admit of cure, but a few resist treatment, and continue till the cessation of the menstrual discharge.

TREATMENT—*Indications.*—I. To relieve the urgent symptoms during the menstrual period. II. To prevent their return by medicines administered in the interval.

I. The first indication is fulfilled, where there is plethora, by the application of leeches or cupping-glasses ; by tepid, hot, or vapor baths ; by opium in full doses. Laudanum and tartarized antimony in minute doses, frequently repeated, and stramonium, are strongly recommended by Dr. Ferguson. (See Libr. Pr. Med., art. Disordered Menstruation.) Colchicum, acetate of ammonia, ergot of rye, and many other remedies, have been proposed. The general remedies to be relied on are anodynes, depletions, and warm applications.

II. The second indication is fulfilled by a careful attention to the functions of the stomach and bowels, moderate depletion to meet any irregular determination of blood, and steel in full doses.

MENORRHAGIA—IMMODERATE FLOW OF THE MENSES.

A flow of the menses is to be considered as immoderate when it either returns more frequently than what is natural, continues longer than ordinary, or is more abundant than is usual with the same person at other times.

It may be the effect of two different and opposite states of

the system : plethora with inordinate arterial vigor, and general relaxation or debility.

SYMPTOMS.—An immoderate flow of the menses, arising from plethora, is usually preceded by rigors, acute pains in the head and loins, turgid flushed countenance, universal heat, and a strong, hard pulse ; on the contrary, where the symptoms of debility are prevalent, the pulse is small and feeble, the face pallid, the respiration short and hurried on the slightest effort ; there are dull, aching pains in the back and loins, and the group of nervous symptoms described under the title *Mimosis Inquieta*. (See p. 253.)

CAUSES—*Predisposing*.—Plethora ; a laxity or debility of the womb, arising from frequent parturition ; difficult and tedious labors, or repeated miscarriages ; a sedentary and inactive life ; indulging much in grief and despondency ; living upon a poor, low diet ; drinking freely of warm enervating liquors, such as tea and coffee ; and living in heated apartments.

The exciting causes of menorrhagia are, violent exercise, as in dancing ; blows or concussions of the belly ; strains ; violent straining at stool ; tight lacing, or other mechanical impediments to the free circulation of the blood ; passions of the mind ; excess in venery, particularly during menstruation ; the application of wet and cold to the feet ; organic affections of the uterus, such as scirrhus, polypus, &c.

PROGNOSIS.—*Favorable*, especially when it is the effect of plethora ; but when it occurs in habits much reduced by previous disease, or is produced by a laxity of the vessels of the organ, is profuse, long-continued, or of frequent recurrence, it will often resist treatment for a long time. When it arises from an organic affection of the part, which is frequently the case after the age of forty-five, it is usually incurable.

TREATMENT.—The treatment of menorrhagia consists in,

1. Reducing the febrile symptoms, when urgent, by general blood-letting, and the means recommended against inflammatory fever ; strictly confining the patient to the horizontal posture ; and avoiding every exertion both of body and mind.

2. Keeping the body gently open with laxative medicines, such as the sulphate of magnesia in infusion of roses, with an excess of acid, and the addition of twenty drops of tincture of henbane.

3. Administering draughts of acidulated cold liquors frequently, as infusion of roses, lemonade, and the like.

4. The internal use of styptics, especially the acetate of lead, as directed against hæmoptysis, when the febrile symptoms are subdued. The muriated tincture of iron is extremely valuable as an astringent.

5. When symptoms of debility are present, tonic astringents ; quinine, cinchona, cascarilla, kino, quercus, and wine.

6. In severe cases, the constant application of astringents to the vagina and hypogastric region ; especially ice, very cold water, or vinegar and water ; or injections, consisting of equal parts of the liquor aluminis compositus and water, will be beneficial, or ice may be passed into the vagina.

In acute and recent cases more active remedies will be required than in the chronic form of the disease, in which more moderate measures continued during a considerable period are indicated. In these cases, the combination of tonics and sedatives, recommended in *mimosis inquieta*, should be prescribed.

LEUCORRHEA—THE WHITES.

This term was originally applied to a white discharge, consisting of mucus, but it is now applied to any discharge arising from merely functional causes, whether the color be white, yellow, greenish, brown, or slightly red.

SYMPTOMS.—The discharge varies in consistence from a limpid fluid to that of a tenacious ropy mucus, and in quantity from a slight increase of the natural secretion of the part to several ounces in the day. The general health is liable to suffer in a variety of ways. The stomach is generally more or less deranged ; the bowels are constipated, or extremely irritable ; spinal irritation is often present, and there is pleuro-dyne, palpitation, and the long train of nervous symptoms described under the title *Mimosis Inquieta* (p. 253).

CAUSES—Predisposing.—Debility, chlorosis, luxurious living, warm rooms. **Exciting.**—Over-excitement of the uterine system, obstruction to the circulation, irritation propagated from neighboring parts, as from the rectum, or reflected from the spinal marrow. The disease occurs at all ages from 15 to 50, and is not uncommon in children under puberty.

TREATMENT.—It is necessary first to ascertain that organic local disease is absent. The indications then are, I. To improve the general health. II. To arrest the discharge.

I. The general health may be improved by the ordinary means, by strict attention to the diet, and to the state of the bowels, which should be kept free by purgatives regularly administered, by regular hours, change of air, cold bathing, &c. The most useful remedy is steel in full doses, or chalybeate waters ; or a combination of tonics and sedatives, as recommended under *Mimosis Inquieta* (p. 253).

II. For the discharge itself many remedies are recommended. In many cases, an alum or zinc injection is sufficient ; in some instances, however, the stronger astringents may be

necessary, as catechu, cinchona, oak bark, tannin, or the rind of the pomegranate. Stimulants may sometimes be required, as ammonia, lunar caustic, or lapis infernalis (gr. 10 to ʒi. of water, *Ricord*). These substances may be used as a wash, or in the form of injection, or they may be introduced into the vagina by means of a cylindrical pessary of sponge. When much irritability is present, opiate injections may be required; and if there is much congestion, or if there are signs of local inflammation, a few leeches may be applied to the neck of the uterus.

The remedies which act on the mucous membrane through the general system are cubebs, copaiba, cantharides, turpentine, alum, and uva ursi.

HYSTERALGIA—IRRITABLE UTERUS.

SYMPTOMS.—Pain in the loins and round the brim of the pelvis, coming on in paroxysms, and increased by exercise or strong mental emotion. The suffering, which is of the most severe kind, generally comes on a few days before or after the menstrual period. It is relieved by the horizontal posture. Pressure on the neck of the uterus gives rise to great pain, and the cervix is found, on examination, puffy and swollen. The general health suffers from the continuance of the pain, and by the confinement which it occasions; the circulation becomes languid, and there is dyspepsia and constipation, and the group of nervous symptoms which constitute *Mimosis Inquieta* (p. 253).

CAUSES.—*Predisposing.*—The nervous temperament; the period of youth and middle age; previous attacks of dysmenorrhœa. *Exciting.*—Undue exertion; long standing, when the catamenia are present; uterine irritation from whatever cause; spinal irritation.

DIAGNOSIS.—From dysmenorrhœa, by the suffering being constant; from prolapsus, by the pain being merely relieved, but not removed, by the recumbent posture; from metritis, by the absence of enlargement, heat, or throbbing, and by the stationary nature of the complaint. The coexistence of other nervous affections, of spinal irritation, of hysteric symptoms, and the peculiarly nervous temperament, will materially aid the diagnosis.

PROGNOSIS.—The disease does not endanger life, but often continues unabated for a long period.

TREATMENT.—*Indications.*—I. To subdue local pain. II. To improve the general health.

I. The first indication is fulfilled by rest in the horizontal posture; by the belladonna plaster, or opiate embrocation to the spine; by injections into the vagina of acetate of morphia

(two to four grains in the ounce of distilled water.—Ferguson); the warm hip bath, or the steam bath; anodynes or sedatives internally, and cautious depletion.

It is most important to examine the spine, as spinal irritation is very apt to coexist. In this case, the tartar-emetic ointment rubbed into the back is of great service.—(G.)

II. The general health must be improved by a generous diet, fresh air, moderate exercise, and, if the patient can bear it, a course of steel and gentle aperients. All causes of debility, such as depletions, active purgatives, and confinement to close rooms, must be avoided.

METRITIS—INFLAMMATION OF THE UTERUS.

SPECIES.—1. Acute; 2. Chronic.

ACUTE METRITIS.

SYMPTOMS.—Pain, increased by pressure in the region of the uterus, and in the cervix, on examination per vaginam; pain extending to the loins and thighs; dysuria; a sense of weight and bearing down; swelling of the abdomen, and tympanites. These local symptoms are generally accompanied by fever, with nausea and vomiting; and sometimes there are symptoms of hysteria. In the most severe cases the fever is followed by head symptoms, as slight delirium, impaired vision, and a tendency to coma, with extreme prostration of strength and subsultus tendinum.

ANATOMICAL CHARACTERS.—The disease may attack the peritoneal or mucous coats alone, or it may involve the substance of the organ. The morbid appearances in the membranes are those of inflammation of the serous and mucous membranes in other parts of the body. When the substance is inflamed, the uterus becomes enlarged, œdematous, and softened; in severe cases, pus is infiltrated through its tissue, or an abscess is formed in it. Purulent matter may also be found in the veins and absorbents. This is most commonly the case in puerperal inflammation of the uterus.

CAUSES—*Predisposing*.—Those of inflammation generally.

Exciting.—Suppression or diminution of the menstrual discharge from cold; the use of astringent injections; mental emotions; frequent sexual intercourse; physical injuries; blows and falls; childbirth.

TREATMENT.—The ordinary antiphlogistic measures; general and local depletion, by cupping to the loins, or by leeches to the vulva or groins; or a combination of calomel, opium, and tartar-emetic in full doses; local fomentations; the hip bath; counter-irritation by mustard poultices or hot turpentine. The dysury may be relieved by mucilaginous drinks,

CHRONIC METRITIS.

This is a common consequence of the acute form, when neglected or badly treated. It may assume a variety of shapes, and lead to a great number of severe structural lesions of the uterus. The most common consequences are ulceration, suppuration, membranous inflammation, and enlargement and induration of the mucous follicles and structure of the organ. For a full account of these forms of disease, the reader is referred to works on this class of diseases. (For a short and concise account of them, see Libr. Pr. Med., vol. x., art. Inflammation of the Uterus, by Dr. Simpson.)

DISEASES OF THE ORGANS OF SENSE.

1. DISEASES OF THE EYE.
2. DISEASES OF THE EAR.

DISEASES OF THE EYE.

1. Inflammation of the Conjunctiva.
2. Inflammation of the Sclerotica.
3. Inflammation of the Cornea.
4. Inflammation of the Iris.
5. Inflammation of the Choroid.
6. Inflammation of the Retina.
7. Amaurosis.

INFLAMMATION OF THE CONJUNCTIVA.

Catarrhal Ophthalmia.

Purulent Ophthalmia . .	{ Of Infants.
	{ Of Adults.

Gonorrhœal Ophthalmia.

Strumous Ophthalmia.

CATARRHAL OPHTHALMIA.

SYMPTOMS.—Redness and itching of the conjunctiva; lachrymation; some intolerance of light, and stiffness of the globe of the eye, followed by pricking pain; the sensation of a foreign body (as a grain of sand) beneath the eyelid, and the gluing together of the eyelashes, especially on first waking in the morning. The redness first shows itself on the conjunctiva of the lids, and gradually extends toward the cornea.

It is evidently superficial, of a bright red color, and in the form of irregular clusters of tortuous vessels. In acute forms of the disease, the whole eye is covered with a net-work of vessels, the secretion thickens and becomes puriform or mucopurulent, and patches of extravasated blood are effused beneath the conjunctiva. If the disease extend to the conjunctiva covering the cornea, the vision is obscured. There is little or no constitutional disturbance beyond the slight feverishness attendant upon a common cold, when the disease is due to that cause.

CAUSES.—Catarrh ; a draft of cold air directed on the eye ; the presence of foreign bodies ; over-exertion of the eye ; exposure to a strong light ; all the causes of inflammation in other mucous membranes.

DIAGNOSIS.—From purulent ophthalmia, except in severe cases, by its milder character, and by its not being contagious. From inflammation of the sclerotic, by the brighter color, larger size, and more tortuous course of the vessels, which are obviously superficial, and can be made to shift their place by the motions of the eyelids ; by the muco-purulent or purulent secretion ; by the absence of acute pain in and around the orbit ; and by the slight intolerance of light, existing chiefly at the onset of the attack. The superficial, bright, tortuous vessels of the conjunctiva, contrasted with the deeper-seated, straight, violet-colored, radiating vessels of the sclerotic, remove all difficulty from the diagnosis.

PROGNOSIS.—*Favorable.*—It is a disease which readily yields to treatment, and when confined to the conjunctiva, does not threaten the loss of vision. In chronic cases, or after repeated attacks, the lids may become thickened, and that part of the membrane which covers the cornea may be rendered opaque, so as to impair the sight.

TREATMENT.—When the disease is strictly local, local remedies alone are required. If it depend on catarrh, and is attended with febrile symptoms, the treatment proper to catarrh must be employed. Dover's powder may be given at night, with a saline aperient in the morning. If the disease, though due to a local cause, should, from its severity, affect the circulation, small doses of tartar-emetic, in combination with a saline aperient, may be given two or three times a day ; and the antiphlogistic regimen may be adopted. General blood-letting will rarely, if ever, be required.

The *local* treatment will consist, in the most severe cases, of cupping or leeches to the temple, and scarification of the lids, with warm fomentations, such as decoction of poppies, applied by means of soft flannel or sponge. When the inflammation has in some degree subsided, and in cases of less se-

verity, from the first, collyria containing the acetate of lead, the sulphate of zinc, the sulphate of copper, or the nitrate of silver, must be prescribed. Of these, the last is to be preferred, in the proportion of four grains to the fluid ounce of distilled water. A large drop of the solution is to be introduced into the inner angle of the eye one, two, or three times a day, as recommended by Dr. Mackenzie. The rest of the treatment consists in the introduction of a small portion of spermaceti or zinc ointment between the eyelids at bedtime, to prevent them from adhering during the night.

PURULENT OPHTHALMIA OF CHILDREN.

SYMPTOMS.—Inflammation in the conjunctiva covering the lids, commencing generally on the third day after birth, and extending gradually over the entire surface of the eye, accompanied by intolerance of light, firm adhesion of the lids, swelling of the eyelids and a copious discharge of purulent matter, which is pent up by the adhesion of the lids, and issues in large quantities on their separation. There is occasional eversion of the eyelids during the cries or struggles of the child, or when an attempt is made to separate them, and the membrane is seen of a bright scarlet color. The discharge is generally yellow, but sometimes greenish, or it is tinged with blood; occasionally it is ichorous. The disease may continue for eight or ten days without involving the transparent parts of the eye; but about the twelfth day, if it is not properly treated, purulent infiltration and consequent opacity of the cornea may take place; or ulceration, with protrusion of the iris; or adhesion of the iris to the cornea. The usual constitutional symptoms are restlessness, sleeplessness, a furred tongue, and disordered bowels, the results of the prolonged local irritation.

DIAGNOSIS.—There is no other disease of the eyes occurring at this early period with which it can be confounded.

PROGNOSIS.—*Favorable*, so long as the cornea retains its transparency. Ulceration of the cornea, according to its degree, threatens injury to, or complete loss of, vision.

CAUSES.—The application of leucorrhœal or gonorrhœal discharge to the eye, during parturition; contagion; the common causes of inflammation?

TREATMENT.—In severe cases, a single leech applied to the upper eyelid, followed by the frequent use of a collyrium, containing one grain of bichloride of mercury in ʒviii. of distilled water, or a solution of from four to ten grains of alum, or four grains of nitrate of silver in an ounce of distilled water. In the more chronic forms of the disease, stronger stimulants may be used, and if the lids present a granular appearance,

they may be touched with the solid nitrate of silver or sulphate of copper.

In milder cases, a little simple ointment placed between the lids; a collyrium containing four or five grains of sulphate of zinc or of alum to the ounce of distilled water, injected beneath the lids several times in the day; and gentle aperients of castor oil, magnesia, or manna, to keep the bowels free.

In consequence of the contagious nature of the disease, the greatest care should be enjoined on the mother or nurse, to prevent the application of the matter to the eyes of other persons.

PURULENT OPHTHALMIA OF ADULTS.

SYNONYM.—Ægyptian ophthalmia.

SYMPTOMS.—Intense inflammation of the conjunctiva, beginning, for the most part, suddenly, affecting, generally, both eyes, accompanied by profuse purulent discharge, and tending to involve the deeper-seated structures of the eye, are the characteristics of this disease. It generally sets in with a sensation of a foreign body beneath the eyelids, speedily followed by injection of the vessels of the conjunctiva, and effusion of serum beneath it, with a discharge of a thick, puriform matter from the surface. The conjunctiva is of a bright red color throughout, the lids and anterior surface of the eye are swollen and granular, and the cornea is sunk, as it were, into a deep pit formed by the projection of the conjunctiva. The swelling is mixed here and there with extravasated blood. So long as the conjunctiva alone suffers, the pain is inconsiderable; but when the deeper-seated textures are involved, the pain is extremely severe, and is felt in the globe of the eye, and around the orbit. In the globe itself it is a sensation of painful tension, and around the orbit it is often allied to hemi-crania. It is intermittent, or aggravated at intervals, and attains its greatest intensity at night. There is but little intolerance of light in any form of the disease. Rupture of the cornea sometimes takes place, with permanent or temporary relief of the pain. The constitutional symptoms are not strongly marked; the pulse is somewhat increased in frequency, the tongue is coated, and the sleep disturbed by paroxysms of pain.

TERMINATIONS.—In resolution; chronic inflammation of the conjunctiva; granular conjunctiva; opacity, ulceration, or sloughing of the cornea; staphyloma; prolapsis of the iris. The disease is very apt to recur.

CAUSES.—Contagion; the common causes of inflammation?

DIAGNOSIS.—From catarrhal ophthalmia by the greater severity of all the symptoms, and the greater tendency to impli-

cation of the deeper-seated parts ; when the disease attacks those parts, by the intensity of the pain in and around the orbit. From diseases affecting the deeper-seated tissues alone, by the presence of severe inflammation of the conjunctiva.

PROGNOSIS.—*Unfavorable*, when very severe, or neglected in its commencement. From its tendency to attack the deeper-seated structures of the eye, loss of vision, or, at least, injury to the sight, may be anticipated. The prognosis should, therefore, be guarded.

TREATMENT.—Venæsection to fainting, followed, if the inflammation is unusually severe, by the application of from twelve to twenty-four leeches around the orbit ; free scarification of the membrane, followed by the application of strong astringents, of which the best is the nitrate of silver ointment of Mr. Guthrie (ten grains of nitrate of silver to $\mathfrak{z}$ i. of lard). The solid nitrate of silver, the solution containing ten grains to the ounce, the undiluted liquor plumbi acetatis, oil of turpentine, and other strong stimulants, have been recommended. In chronic cases, the vinum opii may be used with advantage. Previous to the application of any of these substances, the surface of the eye should be carefully cleansed by a syringe. Aperients should be administered at the outset ; the patient should be put on a spare diet, and enjoined to take exercise in the open air. When the deeper-seated textures of the eye are implicated, the remedies appropriate to the inflammations of those textures should be employed ; such as the belladonna ointment in threatened adhesion of the iris ; puncturing the cornea to prevent the rupture of the membrane ; the application of the nitrate of silver to ulcers on the cornea, or to the protruding iris.

As the disease is highly contagious, great care should be taken to prevent the application of the matter to the eyes of healthy persons.

Gonorrhæal Ophthalmia.

The symptoms and treatment : those of purulent ophthalmia of adults. The cause : inoculation of the eye with gonorrhæal matter. Metastasis ?

STRUMOUS OPTHALMIA.

SYNONYMS.—Scrofulous, pustular, and phlyctenular ophthalmia.

SYMPTOMS.—This disease attacks children from the period of weaning to eight or nine years of age, and sometimes up to the period of puberty. There is a slight and partial redness of one eye, or of both eyes, sometimes confined to the eyelids, and in the form of groups of enlarged vessels running from the

circumference of the eyes to the edge of the cornea, where they terminate in small pustules, which break, and form minute ulcers. Sometimes the injection extends to the conjunctival covering of the cornea, and pustules are formed upon its surface. There is great intolerance of light, the eyebrows are contracted, and the nostrils and upper lip drawn upward. There is a profuse flow of scalding tears whenever the eye is exposed to light, which, flowing over the skin, irritate and inflame it, and sometimes give rise to a pustular eruption, accompanied by white scabs—the *crusta lactea*. The symptoms remit toward evening. The constitutional symptoms are those present in other forms of scrofula, such as glandular enlargements, eruptions on the head and face, sore ears, general debility, tumid belly, disordered bowels, offensive breath. The marks of the scrofulous diathesis are also generally present.

CAUSES—*Predisposing*.—The scrofulous diathesis, and all the circumstances calculated to call it into action. *Exciting*.—The common causes of inflammation; catarrhal ophthalmia; the exanthemata.

DIAGNOSIS.—From catarrhal ophthalmia, by the more partial injection of the vessels, the greater intolerance of light, the formation of distinct pustules, and the presence of other symptoms of scrofula. From purulent ophthalmia, by its less severity and more chronic course, the absence of acute pain in and about the eye, and the age at which it occurs; the purulent ophthalmia of children occurring soon after birth and up to the time of weaning, and the purulent ophthalmia of adults after puberty, while strumous ophthalmia occurs in the interval between weaning and puberty.

PROGNOSIS.—*Favorable* where the constitution is but slightly affected with scrofula, but *unfavorable* when the strumous taint is strongly marked.

TERMINATIONS.—In resolution; in the formation of a “vascular speck,” or of *pannus*; in ulceration of the cornea, followed in some cases by protrusion of the iris, and its adhesion to the cornea; by infiltration of the cornea.

TREATMENT—*Indications*.—I. To improve the general health. II. To restore the vessels of the eye to their natural state.

I. The first indication consists in the treatment recommended for scrofula. Experience seems to point out quinine as the most valuable tonic in this disease.

II. The second indication is fulfilled by warm fomentations to the eye; by vinum opii dropped two or three times a day into the eye; or by the use of any of the astringent collyria, with the red precipitate or citrine ointment, placed between the lids at bedtime; and by counter-irritation, as by blisters behind the ear, by an issue in the arm, or by a ring or thread

passed through the lobe of the ear. If there is ulceration of the cornea, the edges of the ulcers may be touched by nitrate of silver. The crusta lactea may be removed by a broad poultice, followed by a lotion containing a scruple of sulphate of zinc to an ounce of distilled water.

INFLAMMATION OF THE SCLEROTIC.

SYNONYM.—Rheumatic ophthalmia.

This disease is sometimes found uncombined with inflammation of the surrounding textures, but more frequently it is complicated with more or less inflammation of the conjunctiva (*catarrho—rheumatic ophthalmia*), or with inflammation of the iris.

SYMPTOMS.—Bright redness of the globe of the eye, especially around the cornea, where the straight vessels of the sclerotic are seen arranged as radii extending a short distance over the margin of the cornea, and there abruptly terminating. There is an abundant flow of tears, intolerance of light, varying in degree with the severity of the other symptoms; a sensation of fullness and tension, with darting pains in the globe, extending to the parts around the orbit, in the course of the branches of the fifth pair of nerves, increasing toward evening, attaining its greatest intensity at midnight, and subsiding toward morning. There is generally some degree of haziness of the cornea, and vision is more or less impaired.

TERMINATION.—In recovery, or in chronic disease; and if the disease extend to the cornea, or iris, the results of inflammation of those parts.

CAUSES.—*Predisposing.*—Middle age; the male sex; a previous attack of the same disease; the rheumatic or gouty diathesis. *Exciting.*—The common causes of inflammation. The disease is in itself a form of rheumatism.

DIAGNOSIS.—From inflammation of the conjunctiva by the deep-seated redness and radiated arrangement of the vessels; by the secretion of tears in the place of mucus; by the deep-seated pain of the orbit, extending to the surrounding parts; by the intolerance of light; in some cases, by its complication with iritis.

PROGNOSIS.—*Favorable*, if the disease is promptly treated. It is very liable to assume a chronic form, and to return.

TREATMENT.—In acute cases, venæsection to the approach of fainting, repeated if necessary, and followed by the free application of leeches to the temple or forehead; warm opiate fomentations and frictions; counter-irritants, with blisters to the temple, or a liniment consisting of equal parts of laudanum and tinct. lyttæ, rubbed frequently into the temple and forehead. The extract of belladonna is also to be applied during

the whole course of the disease. The bowels should be freely acted on by mercurial preparations, as by hyd. chloridi, gr. iv., pulv. opii, gr. i., every night, followed the next morning by a saline aperient, or by a full dose of castor oil. During the day, the vinum colchici may be given in doses of from ʒss. to ʒiiss. every four or six hours, combined with ten drops of laudanum, and a gentle saline aperient. If administered in this combination, the morning aperient will be unnecessary, and the dose of calomel at night may be diminished, or suspended altogether.

In the chronic form of the disease, the vinum opii may be dropped into the eye, and tonics may be given, such as the disulphate of quinine, the mineral acids, or the tonic infusions. In obstinate cases, the arsenical solution, in doses of eight to twelve drops three times a day, is strongly recommended by Dr. Mackenzie.

CATARRHO—RHEUMATIC OPHTHALMIA.

The symptoms, terminations, and treatment of this disease are those of catarrhal inflammation of the conjunctiva, combined with rheumatic inflammation of the sclerotic. The treatment must necessarily vary as the one or the other disease predominates.

CORNEITIS—INFLAMMATION OF THE CORNEA.

CHARACTER.—A chronic disease of the structure of the cornea, occurring generally in persons of a scrofulous habit.

SYMPTOMS.—The disease begins with a slight haze on the cornea, which gradually increases, till it amounts to opacity. Numerous minute ulcers now form on the surface, and the vessels of the conjunctiva and sclerotic become injected; those of the former membrane ramifying over the surface of the cornea, and giving rise, in extreme cases, to the appearance known as "pannus," and those of the sclerotic being arranged in the characteristic radiated form around the margin of the cornea. Depositions of lymph between the layers of the cornea are also of frequent occurrence; and the secretion of the aqueous humor being augmented, increases the convexity of the membrane. Other complications are apt to occur as the inflammation extends to the surrounding textures of the eye. There is generally but slight intolerance of light, accompanied by lachrymation. The pain is also slight, except occasionally in the first stage, when there is often a sense of tension in the eye, with darting pains in the forehead.

DIAGNOSIS.—From other chronic affections of the eye, by its limited seat; from the more severe diseases of the organ, by its chronic course.

PROGNOSIS.—Generally unfavorable, especially when the general health is much impaired.

CAUSES.—*Predisposing.*—Age, from eight to eighteen; strumous diathesis. *Exciting.*—The common causes of inflammation.

TREATMENT.—In the early stage, local depletion, repeated occasionally in the course of the malady; counter-irritation; and warm anodyne fomentations: astringent applications when the disease has become chronic: the pupil to be kept under the influence of belladonna. The constitutional treatment is that adapted to other forms of scrofulous affection. Quinine is particularly useful in this, as in strumous ophthalmia. Should inflammation of the surrounding textures, as of the iris, take place, the treatment proper to iritis will become necessary. (See Iritis.)

IRITIS—INFLAMMATION OF THE IRIS.

SPECIES.—1. Acute; 2. Chronic.

SUBSPECIES.—Idiopathic; Rheumatic; Arthritic; Syphilitic; Strumous.

ACUTE IRITIS.

SYMPTOMS.—The disease begins by the formation of a red zone of small, straight, parallel vessels, arranged as radii around the circumference of the cornea, and terminating abruptly near its edge, the redness after a time extending to the conjunctiva. The iris soon loses its brilliancy and color, and becomes muddy, and of a tint formed by blending a red with its original hue; the fibrous texture is at the same time impaired or destroyed, and lymph is either effused into its substance, thrown out from its edge, or deposited upon its anterior or posterior surface, or in all these situations. Sometimes the quantity of lymph effused is so large as to fill the chambers of the eye. The movements of the iris are at first impeded, and then altogether suspended; the pupil contracts, and becomes irregular in shape, from effusion into its substance and adhesions to surrounding parts. There is dimness, and at length complete loss of vision. There is generally severe pain in the globe and around the orbit, darting to the cheek and temple, and aggravated at night. The local symptoms are, in the most severe cases, accompanied by acute fever.

DIAGNOSIS.—The diagnostic marks of this disease are, the change of color, and the altered texture of the iris; the irregularity of the pupil; and the effusion of lymph behind the cornea. The peculiar arrangement of the vessels of the sclerotic is common to iritis and sclerotitis.

PROGNOSIS.—*Unfavorable* in the more severe cases, and

when the treatment has been delayed. *Favorable* in milder cases, and in acute cases when promptly treated. A contracted pupil, great vascularity, acute and deep-seated pain, and greatly diminished sensibility or total insensibility to light, are very unfavorable symptoms.

CAUSES—*Predisposing*.—Gout, rheumatism, syphilitic affections, and scrofula. *Exciting*.—Mechanical injuries, surgical operations, over-exertion of the eyes, and the common causes of inflammation.

TREATMENT—*Indications*.—I. To subdue inflammation. II. To promote the absorption of effused lymph. III. To prevent the formation of adhesions.

I. General and free venesection, repeated as often as necessary, and followed, when the more severe symptoms have been subdued, by the local abstraction of blood by cupping or leeches, brisk aperients, a strict antiphlogistic regimen, the exclusion of light, and perfect rest.

II. To fulfill the second indication, and at the same time to prevent the effusion of lymph, mercury must be given from the outset. It should be in the form of calomel, in a dose of two, three, or four grains, combined with from a quarter to half a grain of opium, every three, four, or six hours, according to the severity of the symptoms. In very severe cases, it may be well to resort to mercurial inunction. The calomel and opium may be advantageously combined with tartar-emetic in the dose of from one sixth to one fourth of a grain.

III. To prevent the formation of adhesions, the extract of belladonna should be applied to the eyebrow and lids once in twenty-four hours.

REMEDIES.—Oil of turpentine in the dose of a drachm three times a day. (Dr. Carmichael, of Dublin.) The following is his formula: $\mathcal{R}$. Ol. terebinth. rectific., $\mathfrak{z}$ i.; vitell. unius ovi; tere simul, et adde gradatim mist. amygd., $\mathfrak{z}$ iv.; sirupi aurantii, $\mathfrak{z}$ ii.; tr. lavand. comp., $\mathfrak{z}$ ss.; ol. cinnamomi, gtt. iii. vel. iv. Misce; sumat coch. magna ij. ter die.

CHRONIC IRITIS.—The symptoms are those of the acute form, in a less degree of severity, and extending over a longer space of time. The indications for treatment are the same, but our measures will be more or less active according to the severity of the existing symptoms.

SYPHILITIC IRITIS.—The *symptoms* of this disease nearly resemble those of idiopathic iritis, but they generally make their appearance slowly and insidiously, and are more apt to be overlooked at the commencement. When fully established, this disease, like the more acute forms of it, may prove highly destructive to the eye. In some cases, the symptoms from the beginning are those of acute iritis. The *cause* is, as the

name implies, the venereal taint. The disease sometimes occurs alone; at others, in combination with other secondary symptoms; and it may make its appearance during the existence of the primary disorder. It does not occur in children. The *diagnosis* turns on the position in which the lymph is effused, and on its appearance. It is thrown out on the margin of the iris in the form of globules or distinct masses, of a reddish, brownish, or brownish-yellow color, which are sometimes described as tubercles. At the same time, there is displacement of the pupil upward and inward, the sclerotic zone is of a cinnamon color, and small brown spots form on the cornea. The *treatment* is that of idiopathic iritis: abstraction of blood, general or local, mercury to affect the gums, and the extract of belladonna applied to the eyelids, so as to dilate the pupil.

RHEUMATIC IRITIS.—The *symptoms* are those of idiopathic iritis, and the treatment in the acute stage will be the same. When the acute symptoms have subsided, or in the more chronic forms, disulphate of quinine or the preparations of colchicum may be administered with advantage. The patient should be careful to avoid exposure to cold. Warm fomentations and hot compresses of linen are found to give relief in this form of iritis. Counter-irritation, also, is extremely useful, and stimulant local applications, as the vinum opii, dropped into the eye, have been recommended in the decline of the disorder.

ARTHRITIC IRITIS.—This disease is apt to occur in persons subject to gout, or of gouty constitutions, especially after repeated attacks of gout, or when weakened by abstinence, or any occasional debilitating cause. The *symptoms* bear a general resemblance to those of idiopathic iritis, and in the majority of cases they are those of the acute form. The sclerotic, however, has a peculiar purplish hue, and the radiating vessels stop within one or two lines of the margin of the cornea, leaving a bluish white ring around that membrane, appearances which are characteristic of this affection. The disease is very apt to recur. The *treatment* in acute forms of the disease differs from that of acute idiopathic iritis, inasmuch as salivation is less beneficial, and often injurious; preparations of colchicum should, therefore, be substituted for those of mercury, depletion having been previously practiced, according to the severity of the disease and the state of the patient's constitution. The disulphate of quinine, Fowler's solution, and the sesqui-oxide of iron, have also been recommended. The diet should be carefully regulated, and abstinence from stimulating articles of food and drink must be enjoined. Warmth locally applied, whether dry or moist,

and opiate frictions to the forehead and temple, complete the treatment.

STRUMOUS IRITIS.—This disease is generally the result of an extension of strumous ophthalmia to the deeper-seated structures, and is a chronic and obstinate form of the disease. The constitutional treatment is that of other forms of serofula; the local treatment will be determined by the degree and extent of the existing inflammation. The application of extract of belladonna must be substituted for local stimulants, and topical bleeding and counter-irritants may be necessary.

CHOROIDITIS—INFLAMMATION OF THE CHOROID.

SYMPTOMS.—Inflammation of this membrane rarely exists alone, and when it begins in it, it speedily extends to the other deeper-seated structures of the eye. The pathognomonic symptom of the disease is the formation of a blue zone, of variable width, around the cornea, followed by the protrusion of small dark blue tumors, varying in size and situation; and accompanied by displacement or contraction of the pupil, narrowing of the iris, and opacities of the cornea. There is great pain and intolerance of light; and vision is variously affected, in consequence of the pressure on the retina; dimness of vision and actual blindness often supervene early in the disease. The constitutional symptoms are generally inconsiderable.

TERMINATIONS.—Enlargement of the globe of the eye; watery effusion between the choroid and the retina; absorption of the vitreous humor; inflammation and suppuration of the globe; choroid staphyloma.

CAUSES.—*Predisposing.*—The strumous habit; adult age; female sex. *Exciting.*—Injuries, and the common causes of inflammation.

DIAGNOSIS.—The blue zone around the cornea, followed by the bluish protrusions through the sclerotic, forms the pathognomonic symptom of the disease.

PROGNOSIS.—Generally unfavorable. There is great danger of the sight being lost or permanently injured.

TREATMENT.—General, followed by local blood-letting, mercurial aperients, preparations of antimony, the warm bath, and the antiphlogistic regimen. In the chronic form of the disease, Fowler's solution, in the dose of five or six drops three times a day, with some tonic infusion. Counter-irritation by blisters, the tinctura lyttæ, or the tartar-emetic ointment; puncture of the sclerotic and choroid, to evacuate the serous effusion.

RETINITIS—INFLAMMATION OF THE RETINA.

SPECIES.—1. Acute ; 2. Chronic. -

ACUTE INFLAMMATION OF THE RETINA.

SYMPTOMS.—Acute, deep-seated pain in the globe of the eye, increased by motion or pressure, extending to the brow ; headache, intolerance of light, dimness or loss of vision, with shining spectra of various forms, contracted and motionless pupil. These symptoms sometimes supervene on inflammation of other textures, but they may be followed by it. The pain in the eye and head is often succeeded by delirium, and it is attended with febrile excitement. The disease is rapid in its progress, and, if not promptly treated, is attended with great danger to vision.

TERMINATIONS.—In general inflammation of the entire globe, or of the several structures of the eye, which inflammations are followed by the usual consequences of those diseases.

DIAGNOSIS.—The history of the complaint, with the symptoms mentioned in the foregoing description, will serve to distinguish simple retinitis from other simple diseases of the eye. The diagnosis is more difficult when the inflammation of the iris is complicated with that of other textures.

PROGNOSIS.—In simple acute retinitis favorable, but guarded. In the complicated form of the disease it must vary with the nature of the complications.

CAUSES.—Strong light ; the light and heat of large fires ; the light reflected from the snow or sand ; flashes of lightning.

TREATMENT.—Copious abstraction of blood from the arm, followed, if necessary, by leeches round the eye ; the antiphlogistic regimen ; calomel and opium, given so as to affect the mouth. In complicated cases, the treatment will vary with the nature of the other structures affected.

CHRONIC INFLAMMATION OF THE RETINA.

SYMPTOMS.—Those of the acute form in a less degree : pain less acute, some intolerance of light, dimness of vision, bright, dark, or colored spots before the eye, contraction of the pupil, and sluggish movements of the retina.

CAUSES.—Constant exercise of the eye on minute or dimly illuminated objects ; protracted use of the organ. The abuse of spirituous liquors ? Onanism.

TREATMENT.—Moderate depletion by leeches or cupping to the temples, counter-irritation, a careful regulation of the diet, aperients and alteratives, an abstinence from the exciting cause, shading the eye from the light.

AMAUROSIS—NERVOUS BLINDNESS.

SYNONYM.—Gutta serena.

SYMPTOMS.—Blindness, partial or complete, in one or both eyes. When both eyes are affected, the gait of the patient becomes peculiar. His movements are uncertain, the expression of countenance vacant, the eyeballs either fixed or oscillating, his gaze fixed on vacancy, the pupil generally dilated and insensible to light, but sometimes movable, both its independent and associated movements being perfectly performed.

DIAGNOSIS.—From blindness, the effect of disease of the transparent textures of the eye, by the perfect clearness and transparency of the pupil.

VARIETIES.—1. Inflammatory amaurosis (see Retinitis); 2. Anemic amaurosis; 3. Hysteric amaurosis; 4. Dyspeptic amaurosis; 5. Amaurosis from disease of the brain, or injuries to the nerves of the eye.

TREATMENT.—This must vary with the cause. As the seat of the disease is not an object of sense, the cause of it must be inferred from the history of the patient. If he has been exposed to any of the causes of inflammation of the retina mentioned under *retinitis*, bleeding, followed by calomel and opium, with antiphlogistic remedies, and perfect rest of the organ, must be resorted to; if there is evidence of unusual fullness of blood, especially in the vessels of the head and face, and the blindness, if partial, is increased by all causes which increase that determination of blood, bleeding and low diet must be prescribed, with a view of reducing existing plethora. If the disease supervene on hæmorrhage, hyperlactation, or other long-continued debilitating discharges, the treatment must be that indicated by such a state of system. Hysteric amaurosis, occurring, without other apparent cause, in females subjected to hysteric fits, hysteric aphonia, or other anomalous disorders of the nervous system, must be treated as hysteria. When amaurosis is referable to dyspepsia, worms, or other gastric or intestinal irritation, the treatment must be directed to the condition of the alimentary canal, and to remove the exciting cause. Amaurosis dependent upon disease of the brain, or on irritation of the retina or branches of the fifth pair of nerves, may be occasionally cured by removing the cause. Blindness has, in one reported case, been cured by the removal of a carious tooth, into which a spicula of wood had been introduced, and occasionally under a course of mercury; amaurosis, apparently depending upon pressure within the brain, has been cured by salivation.

The treatment of amaurosis, then, must depend upon the

cause, which can be known only by a careful consideration of all the circumstances, and of the previous history of the case. In chronic cases, and on the ascertained absence of inflammation of the retina, electricity or strychnine may be resorted to. The electric fluid may be applied by means of sparks drawn from the eyelids and parts around the orbit, the strychnine may be sprinkled on a blistered surface above the brow, beginning with a sixth of a grain, and increasing the quantity gradually and cautiously.—(Middlemore.)

DISEASES OF THE EAR.

1. OTITIS EXTERNA . . . Inflammation of the External Ear.
2. OTITIS INTERNA . . . Inflammation of the Internal Ear.

OTITIS EXTERNA—INFLAMMATION OF THE EXTERNAL EAR.

SPECIES.—1. Acute ; 2. Chronic.

ACUTE INFLAMMATION OF THE EXTERNAL EAR.

SYMPTOMS.—Pain in the auditory canal, gradually increasing in severity, and augmented by cold, pressure, and the motions of the jaw ; deafness ; noises in the ear ; redness and swelling of the lining membrane ; and after an interval of a few hours, or of one or two days, a thin, acrid, fetid discharge, often tinged with blood, and at length becoming puriform. The inflammation is followed by enlargement of the mucous follicles, and terminates by suppuration, ulceration, and the formation of scabs, or of painful granulations.

TERMINATIONS.—In resolution, or in the chronic form, accompanied by chronic deafness.

CAUSES.—*Predisposing.*—Childhood ; the scrofulous diathesis. *Exciting.*—Cold ; the introduction of foreign bodies into the ear ; chemical irritants ; the stings of insects ; the sudden suppression of eruptions of the scalp or face ; the extension of inflammation from surrounding parts ; the exanthemata.

TREATMENT.—Poultices and warm fomentations to the ear ; the injection of warm water, either pure, or containing from five to ten grains of acetate of lead to the ounce ; in severe cases, leeches behind the ear, blisters or tartar-emetic ointment over the mastoid process ; aperients, tartar-emetic in nauseating doses ; a spare diet, and antiphlogistic remedies. If an abscess should form, poultices and warm fomentations, to promote suppuration and encourage the discharge.

CHRONIC INFLAMMATION OF THE EXTERNAL EAR.

SYMPTOMS.—The same as in acute otitis, but less severe, and of long continuance.

TREATMENT.—If the disease is still recent, and the acute stage has only partially subsided, injections of warm water, or of a weak solution of acetate of lead, should be used several times in the day, for several days together, followed by weak astringents, such as solutions of alum, sulphate of zinc, and nitrate of silver, gradually and cautiously increasing their strength. If there are granulations of the mucous membrane, tents of lint or cotton, dipped in a solution of acetate of lead or sulphate of zinc, may be introduced into the meatus. The general treatment will consist in the steady use of aperients and alteratives, nourishing diet, pure air, and cleanliness; and if there is much debility, tonics, of which steel is the best. If the discharge should suddenly cease, and symptoms of head affection occur, hot poultices and fomentations should be applied to the external ear, at the same time that the head affection is met by appropriate remedies.

ACUTE INFLAMMATION OF THE INTERNAL EAR.

SYMPTOMS.—Acute, deep-seated pain in the ear, accompanied by pain of the head and face of the same side, and increased by mastication; a sense of tension in the ear; loud noises; deafness; sometimes swelling of the tonsils, and sense of tension, with dull pain or itching at the back of the throat. There is a frequent, quick, and hard pulse, hot skin, anxious countenance, furred tongue, anorexia, general febrile excitement, restlessness, sleeplessness, and in very severe cases, delirium and convulsions.

TERMINATIONS.—In resolution, with gradual subsidence of the symptoms; in suppuration, accompanied by throbbing pain and sense of extreme tension, followed by a discharge of matter by the external meatus, the membrana tympani having been ruptured, through the Eustachian tube into the throat, or through an opening in the mastoid process.

CAUSES.—Those of inflammation of the external ear; the extension of inflammation from the back of the throat through the Eustachian tube.

DIAGNOSIS.—From inflammation of the external ear by the deeper-seated pain, the absence of discharge from the external meatus in the early stage of the disease, and the results of an examination of the external ear. The rupture of the membrana tympani may be recognized by causing the patient to expire forcibly, the mouth and nostrils being closed, when air will issue from the external opening of the ear.

PROGNOSIS.—Deafness is a very common consequence of this disease. Inflammation extending to the dura mater, and other membranes of the brain, is an occasional consequence. Hence the importance of a guarded prognosis.

TREATMENT.—Bleeding, followed by cupping or leeches behind the ear, and counter-irritation, by blisters or tartar-emetic ointment, brisk purgatives, and nauseating doses of tartar-emetic. If there is reason to believe that suppuration has taken place, and there is extreme tension, with throbbing pain in the ear, and violent headache and delirium, instantaneous relief may often be afforded by puncturing the membrana tympani, washing the ear out repeatedly with tepid water, and facilitating the discharge of matter from the tympanum by causing the patient to lie on the affected side. If there is swelling or inflammation in the fauces, astringent gargles should be prescribed, or the steam of warm water should be inhaled. If there is reason to believe that the Eustachian tube is obstructed, the air douche or the ear catheter may be employed. For further information on this part of the treatment, consult surgical works on Diseases of the Ear.

CHRONIC INFLAMMATION OF THE INTERNAL EAR.

SYMPTOMS.—The principal symptom of chronic inflammation of the ear, whether external or internal, is a discharge of mucous, muco-purulent, or purulent matter (otorrhœa) from the external meatus. This may continue for months or years, accompanied by deafness, and either subsiding of itself, or yielding to the use of injections.

TERMINATIONS.—In caries of the temporal bone ; in destruction of the parts within the tympanum ; in cerebral disease ; in permanent deafness.

TREATMENT.—The same as in chronic inflammation confined to the external ear, combined with the use of gargles, the air douche, or of the ear catheter, with the precautions laid down in works on Diseases of the Ear. The purely medical treatment will be regulated by the existing state of the constitution. If it is connected with scrofula or syphilis, the remedies proper to those diseases ; if combined with skin diseases affecting the head and face, the remedies required by the particular form of skin disease ; if with a deranged state of the digestive organs, aperients and alteratives. Wholesome diet, cleanliness, pure air, proper exercise, and a strict attention to the state of the bowels, with tonics and alteratives, should be particularly insisted on in all forms of the disease.

CHAPTER VIII.

CUTANEOUS DISEASES.*

ORDERS.

1. EXANTHEMATA	Rashes.
2. VESICULÆ	Vesicles.
3. BULLÆ	Blebs.
4. PUSTULÆ	Pustules.
5. PAPULÆ	Pimples.
6. SQUAMÆ	Scales.
7. TUBERCULÆ	Tubercles.
8. MACULÆ	Spots.

DEFINITIONS.

1. *Exanthemata*—*Rashes*.—Superficial red patches, variously shaped, circumscribed, or diffused, disappearing on pressure, and terminating by resolution, delectescence, or desquamation.

This order comprises six genera: rubeola, scarlatina, erysipelas, erythema, urticaria, and roseola.

2. *Vesiculæ*—*Vesicles*.—Small, round, pointed elevations of the epidermis, or cuticle, containing lymph, which is either transparent and colorless, or opaque and pearly, and differing from bullæ by their smaller dimensions. These small blisters break and discharge their contents, and are succeeded by scurf, by a lamellated crust, or by superficial excoriations. Occasionally their contents are absorbed.

The genera of this order are, miliaria, varicella, eczema, herpes, and scabies.

3. *Bullæ*—*Blebs*.—Vesicles of larger size, but having the same general characters and terminations.

The genera of this order are pemphigus and rupia.

4. *Pustulæ*—*Pustules*.—Circumscribed elevations of the cuticle, containing pus or matter, and terminating in thick crusts or scabs.

The varieties of pustules are,

a. *Phlyzaciūm*, or a pustule of considerable size, surrounded by a hard circular base of a bright red color, and succeeded by a thick, dark scab or incrustation.

b. *Psudraciūm*, or a small pustule, slightly elevated, sur-

* In treating this class of diseases, the arrangement adopted in Dr. Burgess's translation of Cazenave and Schedel's "Manual of Diseases of the Skin" has been followed, and the reader is referred to that work for more detailed information.

rounded by a pink efflorescence; its base often irregular, or but faintly marked, sometimes confluent, and terminating in a thin, laminated, circular incrustation.

c. Achor, or a small acuminate pustule, filled with straw-colored gelatinous fluid, surrounded by an irregular efflorescence, but marked between it and its base by a faint interspace, usually confluent, terminating in a thin, light-brown irregular crust.

d. Favus, or an irregular pustule of a large size, scarcely elevated, containing a more viscid straw-colored fluid, surrounded by a rose-colored base, terminating in a yellow, semi-transparent, or cellular crust, and sometimes by a superficial ulceration.

The genera of this order are, variola, vaccinia, ecthyma, impetigo, acne, mentagra, porrigo, and equinia.

5. *Papulæ—Pimples*.—Small, firm, pointed elevations of the skin, usually terminating in scurf, and very rarely by ulceration of the summit.

The genera of this order are lichen and prurigo.

6. *Squamæ—Scales*.—Indurated, opaque, whitish or yellowish laminae of the cuticle, covering papulæ or inflamed surfaces. They are continually being detached and renewed.

The genera of this order are, lepra, psoriasis, pityriasis, and ichthyosis.

7. *Tubercula—Tubercles*.—Small, hard, solid, circumscribed tumors, larger than papulæ, with or without an inflamed base, permanent or persistent, imbedded in the skin, and terminating in resolution, partial suppuration, or destructive ulceration.

The genera of this order are, lepra tuberculosa, lupus, molluscum, and frambœsia.

8. *Maculæ—Spots*.—Permanent discolorations, or decolorations of the skin, often accompanied by change of structure, but not affecting the general health.

Its genera are, discolorations—*fuscedo cutis*, *ephelis*, and *nævus*. Decolorations—*albinismus* and *vitiligo*.

Besides the foregoing, there are other diseases of the skin which admit of no exact classification; of which the principal are, lupus, pellagra, malum Alepporum, syphilida, purpura, elephantiasis Arabum, and cheloidea.

ORDER I.

EXANTHEMATATA—RASHES.

RUBEOLA	Measles (p. 233).
SCARLATINA	Scarlet Fever (p. 236).
ERYSIPELAS	St. Anthony's Fire (p. 242)
ERYTHEMA	Inflammatory Blush.
URTICARIA	Nettle-rash.
ROSEOLA	Rose-rash.

ERYTHEMA—INFLAMMATORY BLUSH.

SYNONYMS.—Intertrigo; maculæ volaticæ; tooth-rash; gum.

SPECIES.—*Erythema fugax*; *erythema læve*; *erythema papulatum*; *erythema tuberculatum*; *erythema centrifugum*; *erythema nodosum*.

SYMPTOMS.—Redness of the surface, in patches of variable form and extent, disappearing on pressure, with little or no swelling, heat, pain, or fever. It is not contagious, nor in itself attended with danger.

TERMINATIONS.—In resolution without desquamation; or in resolution with slight desquamation (*E. fugax* and *E. læve*); or in a sero-purulent exudation of a disagreeable odor (*E. intertrigo*).

CAUSES.—Friction; heat and cold; acrid discharges, as those of coryza, leucorrhœa, or gonorrhœa; and the urine and fæces; irritation of internal parts, as in dentition; difficult menstruation, and dyspepsia; tension of the skin, as in anasarca.

DIAGNOSIS.—From *Erysipelas*, by the redness being lighter and more superficial; by the less degree of swelling, and the absence of heat and pain; and by its milder character, and more favorable termination. From *Roseola*, by the peculiar rosy tint of the latter. From *Rubcola* and *Scarlatina*, by the semilunar patches of the first, and by the great extent and deep-red hue of the last. Also by the peculiar constitutional symptoms and contagious character of these diseases.

PROGNOSIS.—Unattended with danger, and generally disappearing with the removal of the exciting cause. Sometimes chronic and permanent, especially when occurring on the legs of persons advanced in life.

TREATMENT.—When idiopathic, it soon disappears of itself, or yields to gentle aperients, spirit lotions, and the warm bath. If symptomatic, it does not long survive the removal of its cause, and its treatment is that of the primary disease.

Of the varieties of erythema, the following deserve attention: *Erythema papulatum*, which occurs in young persons of

both sexes, on the trunk and upper extremities, in the form of small, round, and slightly prominent patches, which disappear entirely in the course of a few days. *Erythema tuberculatum*, in which the patches are larger, more prominent, and more permanent. *Erythema nodosum*, which occurs chiefly in children and young persons of both sexes, on the extremities, its most common situation being the fore part of the leg, its form rounded or oval, varying in size from a fourpenny piece to that of a half crown or five-shilling piece, at first slightly raised above the surface, and in a few days assuming the form of red painful tumors. The color gradually changes from red to blue; the tumors soften, and disappear in from a week to a fortnight. This form of erythema is generally preceded by loss of appetite and slight constitutional symptoms. *Erythema centrifugum*, appearing in most cases on the cheek, in the form of small round patches, raised above the surface, which gradually spread from a small pimple till they cover a great part of the cheek. It is accompanied by heat and redness, and is apt to continue for several days. It is often connected with disorders of the menses.

These varieties of erythema do not demand any peculiar treatment. They either disappear of themselves, or they require gentle aperients, cold lotions, and tepid baths. In unusually severe cases, small doses of tartar-emetic may be combined with saline aperients.

URTICARIA—NETTLE-RASH

SYNONYMS.—Essera; aspretudo; febris urticata; papulæ cuticulares.

SPECIES.—Urticaria evanida; urticaria febrilis.

SYMPTOMS.—An eruption resembling that produced by the stinging of nettles, whence its name. These little elevations often appear instantaneously, especially if the skin be rubbed or scratched, and seldom stay many hours, sometimes not many minutes, in the same place; but vanish, and again make their appearance in another part of the skin. The parts affected with the eruption are often considerably swelled. In some persons, the eruption lasts a few days only, in others many months or years, appearing and disappearing at intervals. Long weals are sometimes observed, as if the part had been struck with a whip. The little eminences always appear solid, not having any cavity or head containing either water or any other liquor. Intolerable itching is their invariable concomitant. They generally disappear in the daytime, and in the evening again break forth, accompanied with slight symptoms of fever. They terminate in a desquamation of the cuticle.

CAUSES.—Handling the leaves of the common nettle; use

of shell-fish, lobsters, and muscles ; mushrooms ; honey ; vinegar ; cucumbers ; salad ; valerian, turpentine ; copaiba.

DIAGNOSIS.—The pathognomonic characters of this disease are its peculiar form and elevation, the itching which attends it, and its fugitive character.

PROGNOSIS.—It may generally be expected to disappear under the use of simple remedies, but it occasionally lasts for months or years. It is quite unattended with danger.

TREATMENT.—If caused by irritating food, an emetic, followed by a gentle aperient, which may be combined, in severe cases, with tartar-emetic in small doses. The smarting may be allayed by lotions of acetate of lead, or cyanide of potassium, or by the warm bath. In chronic cases, warm or vapor baths, alkaline or sulphur baths, together with a strictly regulated diet, aperients, and alteratives. In very obstinate cases, Fowler's solution, in doses of five or six drops three times a day, with some tonic infusion.

The following species demand attention : *Urticaria cranida*, which answers to the above description, and is characterized by the rapid disappearance and reappearance of the patches, and the *urticaria febrilis*. This is generally caused by some particular article of food which has disagreed with the patient. There is more or less fever or constitutional disturbance, followed by heat and tingling of the body ; and then by an eruption, beginning on the shoulders, loins, and inner surface of the arms and thighs, and round the knees, consisting of irregularly shaped pale blotches, surrounded by a deep red border, accompanied by intense itching. The blotches appear and disappear several times in the course of the disease, and gradually subside in a few days or a week. There is generally an increase of itching and smarting toward evening.

ROSEOLA—ROSE-RASH.

SYNONYMS.—Rosalia ; rosacia ; rubeola spuria.

SPECIES.—Roseola infantilis ; roseola æstiva ; roseola autumnalis ; roseola annulata.

SYMPTOMS.—Slight febrile symptoms, succeeded by patches of various size and form, of a deep rose color, appearing on different parts of the body, and generally disappearing in one or two days, or a week.

CAUSES.—Teething ; irritation of the stomach and bowels ; drinking cold water when the body is heated ; severe exercise. The disease is sometimes epidemic, and it occasionally precedes the eruption of the small-pox, in which case it is apt to occasion some difficulty in the diagnosis.

DIAGNOSIS.—From measles and scarlet fever, by the mildness of the constitutional symptoms. The irregular semilunar

patches of the former, and the greater extent of the latter, will serve to complete the diagnosis.

PROGNOSIS.—A favorable termination after a few days or a week. It is unattended with danger.

The following species require attention : *Roseola infantilis*.—An eruption of numerous small distinct circular patches, of a deep rose-red color, occurring in infants from dentition or intestinal irritation. *Roseola æstiva*.—This form is preceded by symptoms of fever, sometimes of considerable severity, accompanied by delirium and even by convulsions. It is most common in children and females. The eruption commonly appears between the third and seventh days on the face and neck, whence it rapidly spreads over the rest of the body. It is of a deep red color, attended with itching and pain. It lasts about three or four days, and then disappears. The *roseola autumnalis* is a less severe affection, occurring also chiefly in children, and presenting larger patches, seated chiefly on the upper extremities. *Roseola annulata*, appearing, as the name implies, in rosy rings, inclosing a portion of healthy skin, and gradually spreading. Their most common situations are the belly, loins, buttocks, and thighs. It may be acute or chronic, and is generally dependent upon some disorder in the primæ viæ.

ORDER II.

VESICULÆ—VESICLES.

MILIARIA	Miliary Fever (p. 246).
VARICELLA	Chicken-pox (p. 232).
ECZEMA	Humid Tetter.
HERPES	Tetter.
SCABIES	The Itch.

ECZEMA—HUMID TETTER.

SYNONYMS.—Running scall ; crusta lactea.

SPECIES.—1. Acute ; 2. Chronic.

SUBSPECIES OF THE ACUTE.—Eczema simplex ; eczema rubrum ; eczema impetiginodes.

ACUTE ECZEMA.

SYMPTOMS.—An eruption of small vesicles, closely crowded together on broad, irregular patches of inflamed skin, accompanied by severe itching, tingling, or smarting pain. The fluid in the vesicles soon becomes opaque and turbid, and is either absorbed or the vesicle bursts ; and the disease terminates by desquamation of the cuticle, or the formation of thin scales. Its usual duration is from a week to a month.

CAUSES.—*Predisposing*.—The female sex ; the seasons of spring and autumn. *Exciting*.—Exposure to intense heat ; irritation of the skin by a blister ; frictions with mercury (*eczema mercuriale*) ; the handling of dry powders, flour, metals, &c. Contagion ?

DIAGNOSIS.—From *Scabies*, by the vesicles of eczema being more clustered and less pointed ; by the smarting of eczema contrasted with the itching of scabies. From *Miliaria*, by the vesicles being smaller ; by the absence of severe constitutional symptoms, and the profuse perspiration. From *Lichen agrius*, by the presence in the latter of distinct papulæ, and by the deeper color of the skin. From *Psoriasis*, by the presence of vesicles, and the thinner scales ; and by the absence of fissures, except in the bendings of joints and the natural folds of the skin.

PROGNOSIS.—*Favorable* in the acute form. The chronic disease is often very difficult of cure.

TREATMENT.—Aperients, cooling drinks, simple diet, and warm baths. If attended with much inflammation or fever, general or local depletion, with a more strict antiphlogistic diet, and brisker aperients, combined with antimonials. Emollient applications, as local baths of marsh-mallow or bran, or poultices of potato flour. If the disease is incurred by the employment of the patient, it may be necessary to oblige him to desist from following it.

The following varieties of acute eczema require special notice : *Eczema simplex*.—A mild form of the disease, generally terminating in resolution ; its most frequent situation, the arm and forearm, and between the fingers. It is not preceded or attended by constitutional disturbance. It is of most frequent occurrence in women and young children. *Eczema rubrum*.—In this variety, the skin is inflamed, hot, and tense ; of a bright red color, and covered with small vesicles surrounded by an inflamed areola. The disease generally terminates in about a week, with slight exfoliation of the cuticle ; but in more severe cases, the inflammation increases, the vesicles coalesce, the contained serum becomes opaque, and at length escapes as an irritating fluid, which forms loose thin incrustations, and these falling off, display a highly inflamed surface. The disease either disappears in two or three weeks, the healing process beginning at the margins, or it becomes chronic. *Eczema impetiginodes*.—In this form, the inflammation is still more acute and rapid in its progress, and accompanied by much swelling and tension, the contents of the vesicles become purulent, and dry into soft yellow scabs. These scabs fall off, and are reproduced, displaying an inflamed surface covered with a reddish serosity. When very severe, it

gives rise to febrile symptoms. It generally terminates in three weeks or a month, the skin gradually assuming a more healthy appearance, or it runs into the chronic form. This form of eczema is distinguished from impetigo chiefly by the vesicles being at first transparent, whereas impetigo is a pustular disease from the beginning. The scabs of impetigo are also thicker than the scales of eczema.

CHRONIC ECZEMA.

SYMPTOMS.—This is a sequela of the acute form, and is often a very intractable disease. The skin, in consequence of the continued discharge of acrid serum and the reproduction of the vesicles, is highly inflamed, and marked by fissures at the joints. There is an abundant secretion from the surface, which causes the clothes to adhere to the skin. In other instances there is no exudation, but the surface is covered with shining crusts, and marked by fissures. Beneath the crust the skin is of a bright red color. The disease often spreads from a small point over a considerable extent of surface, and is accompanied by intense itching, which is particularly distressing when the eruption occupies the inner surface of the thighs, the verge of the anus, or the vulva of females. The eruption often lasts for years, being heightened and renewed at spring and autumn.

TREATMENT.—That of the acute form, when the inflammation is severe. When the inflammation is less acute, alkalies administered internally and applied externally; the alkali may be combined with some of the bitter infusions. Plummer's pill, or small doses of tartar-emetic, with hyd. c. cretâ, may be given as an alterative three times a day. The sulphureous baths, or a bath containing three ounces of sulphuret of potash, may be used with advantage. Vapor baths, or the vapor douche, may also be recommended. To allay the itching, lotions of lead, decoction of dulcamara, or emulsion of bitter almonds may be used. In obstinate cases, one of two remedies—tincture of cantharides, or arsenic—the first in doses of three or four drops three times a day, gradually increased and combined with some tonic infusion; the second in the form of Fowler's solution, in doses of five or six minims three times a day, cautiously increased, and combined with infusion of quassia; or it may be given with ammonia or iron, according to the existing state of the system.

HERPES—TETTER.

SYNONYMS.—Dartre; olophlyctide.

SPECIES.—Herpes phlyctenodes; herpes labialis, and preputialis; herpes zoster; herpes circinatus; herpes iris.

SYMPTOMS.—Circumscribed groups of vesicles on an inflamed base, with intervals of sound skin between the vesicles, which are at first distinct, and contain a transparent fluid, but soon coalesce, the fluid becoming yellowish-white, or yellow. The contents of the vesicles escape, and form a scab that soon falls off, leaving an inflamed surface, which rapidly heals. The eruption is commonly preceded by slight constitutional symptoms, and sometimes by acute darting pain, which, when the eruption has made its appearance, changes to heat and smarting. The disease is rarely severe or attended with any danger, and generally lasts about a week or ten days.

Herpes phlyctenodes is the name given to those varieties of the disease which have no particular seat. *Herpes labialis* occupies, as its name implies, the lips, but may extend to the nose, cheeks, and chin; it also attacks the mucous membrane of the lips and mouth. It is a very common accompaniment of catarrh, and of inflammatory affections of the mucous membrane of the mouth, throat, and stomach. *Herpes preputialis* attacks the internal or external surface of the prepuce, and is preceded and accompanied by itching and smarting. It is necessary to distinguish it from syphilis, which is easily done in its recent stage, and afterward by a careful attention to its history. The sore remaining after the vesicles have burst is superficial, and readily healed by separating the two surfaces of the prepuce by lint, and thus preventing friction. *Herpes zoster, zona, or the Shingles.*—This eruption is very characteristic in its appearance, its position, and its course. As the name implies, it surrounds the body like a zone or girdle, beginning somewhere about the mesian line, and traveling round one half the body, below the nipple, at the lower part of the back and groin, or at the upper part of the thigh. It is often preceded for several days, or even longer, by very acute darting pains. It runs a mild course, and disappears in two or three weeks. *Herpes circinatus.*—This form is arranged in rings, with a red border, and a center of sound skin. *Herpes iris.*—This is a very rare variety, appearing in round groups, and consisting of four rings of different shades of color.

CAUSES—Predisposing.—The female sex; youth and middle age, but it occasionally occurs in old people. **Exciting.**—Catarrh; inflammation of the mucous membranes; certain disorders of the digestive organs.

DIAGNOSIS.—From *Pemphigus*, by the size of the vesicles, and the arrangement in groups. The vesicles of pemphigus are much larger and isolated. From *Eczema*, by the vesicles in the former being more raised, and in the first onset more distinct. As a general rule, the patches of herpes are smaller. The situation of herpes labialis and preputialis, and the

peculiar course and arrangement of herpes zoster, will serve to distinguish those varieties. *Herpes circinatus* is distinguished from patches of *lepra*, from *porrigo scutillata*, and *lichen circumscriptus*, by its vesicular character.

PROGNOSIS.—*Favorable*.—The disease lasts from a week to a month, and in rare cases longer.

TREATMENT.—Gentle aperients with antimonials, and a regulated diet, and local applications of warm mucilaginous liquids. The constitutional treatment must be regulated by the age and existing state of system. The vesicles may be punctured with advantage, and friction should be guarded against.

SCABIES—THE ITCH.

SYNONYM.—*Psora*.

SYMPTOMS.—The usual seat of this eruption is between the fingers, on the wrists, inside of the forearm, and at the bends of the joints; but it may affect any part of the body but the face. It generally makes its appearance within a few days of the exposure to the contagion, and is accompanied by itching, increased toward evening, and at night, and by all causes which excite the circulation. It consists of numerous pointed vesicles, containing serum, and raised slightly above the surface. In severe cases these vesicles increase in size, and become filled with pus (*scabies purulenta*), or they are destroyed by friction, and leave small red spots.

CAUSES.—*Predisposing*.—Youth; the male sex; the sanguine temperament; the seasons of spring and summer; high temperature. *Exciting*.—Contagion; the *acarus scabiei*.

DIAGNOSIS.—From *Prurigo*, by the latter being a papular eruption, situated generally on the trunk or lower extremities, not contagious, and occurring generally in persons advanced in life. From *Lichen*, by the latter being papular, more clustered, and, if situated on the hand, being at the back of the hand, and not between the fingers. From *Eczema*, by the vesicles of eczema being more clustered, and flatter; by the absence of contagion; by the peculiar and smarting pain; and often by the situation. The fact that scabies does not attack the face, distinguishes it from all skin diseases having that seat.

PROGNOSIS.—*Favorable*, but sometimes obstinate. Its more usual duration is a week or ten days, but it may continue for months.

TREATMENT.—Sulphur ointment, or an ointment of sulphur and subcarbonate of potash; sulphur baths; sulphuret of lime, with olive oil; a lotion consisting of super-sulphate of potash (sulphate of potash, ziv .; sulphuric acid, zss .; water, Oiss.); hellebore ointment; an ointment of hydriodate of potash. Clean-

liness, and the warm bath ; gentle aperients if required, and, in very rare cases, bleeding, are useful auxiliaries.

ORDER III.

BULLÆ—BLEBS.

PEMPHIGUS	Vesicular Fever.
RUPIA	Atonic Ulcer.

PEMPHIGUS—VESICULAR FEVER.

SYNONYMS.—Bullæ ; phlyctena ; pompholix ; hydatis ; febris bullosa ; febris vesicularis.

SPECIES.—*Pemphigus infantilis* ; *pompholix solitarius* ; *pompholix diutinus*.

SYMPTOMS.—The usual symptoms of the cold stage of fever ; lassitude, headache, sickness, oppression, frequent pulse, in some instances delirium.

On an *uncertain day* an eruption of red circular patches, which soon terminate in pellucid blisters, similar to those produced by a burn ; varying in size, sometimes as large as walnuts, more frequently about the size of almonds ; surrounded by an inflamed margin or areola, and distended with a faintly yellow serum. They appear on the face, neck, trunk, arms, mouth, and fauces.

After the blisters have remained from one to several days, they either break, and discharge a yellowish, bland, or sharp ichorous fluid, or they begin to shrink, and in a short time disappear.

Pemphigus infantilis is apt to appear in young infants in lying-in hospitals. It presents the usual character of pemphigus, but has been mistaken for syphilis. *Pompholix solitarius*, characterized by the appearance of a single bleb at a time, on successive days, or at short intervals, and assuming either an acute or chronic form. *Pompholix diutinus*, an essentially chronic disease, occurring for the most part in middle aged and old men, lasting for a considerable time, and sometimes extending over the entire surface of the body.

CAUSES.—*Predisposing*.—The male sex ; adult and old age ; summer season. *Exciting*.—Unwholesome and scanty food, bad ventilation, and all the causes of cachexia. Specific infection ?

DIAGNOSIS.—From *Vesicular Eruptions*, by the larger size and less clustered form of the vesicles. From *Rupia*, by the absence of thick scabs. From *Ecthyma*, by the contents of the vesicle being transparent. From *Erysipelas*, by the irregular

vesicles of the latter appearing on a highly inflamed surface, which is constantly spreading.

PROGNOSIS.—Generally favorable. But the disease may be of long continuance.

TREATMENT.—That proper for the concomitant fever, and varying with its type. In common cases, gentle aperients, antimonial, and acid drinks. As the disease generally occurs in cachectic or debilitated constitutions, tonics or stimulants, and generous diet, will be required.

The local treatment will consist in puncturing the vesicles as they appear; and, if there is much pain, emollient applications must be applied to the skin. Disorders of the alimentary canal, which frequently accompany the disease, must be treated by the remedies appropriate to the particular disorder.

RUPIA—ATONIC ULCER.

SYNONYM.—*Ulcus atonicum*.

SPECIES.—*Rupia simplex*; *rupia prominens*; *rupia escharotica*.

SYMPTOMS.—This disease commonly attacks cachectic persons, and those whose constitutions have been impaired by privation and unwholesome influences, or by previous disease. It consists in the appearance of round, flattened, and isolated blebs, about the size of a shilling, filled with a serous fluid, which changes after a time to pus. These blebs shrink, and become covered with thick brownish crusts, beneath which the skin is slightly ulcerated. When the scabs fall off, the ulcers either heal or continue open for a while. The disease is chronic, and continues from a few weeks to several months. Its most common seat is the lower extremities.

Rupia simplex is the mildest form of the disease, and answers to the above description.

Rupia Prominens.—This differs from the foregoing chiefly in the larger size of the blebs, the greater thickness of the scabs, and the greater extent of the inflammation and subsequent ulceration. The scabs are formed by several layers of hardened secretion, and assume a conical shape, and an appearance not unlike that of an oyster-shell in miniature.

Rupia escharotica affects infants in the interval from birth to the first dentition, is accompanied by much constitutional disturbance, and sometimes terminates fatally. The ulcers left after the separation of the scabs are longer healing, apt to spread, and secrete a fetid sanies.

CAUSES.—All those circumstances which tend to produce a cachectic state of the system.

DIAGNOSIS.—From *Pemphigus*, by the thick laminated scab, the inflammatory areola, and subsequent ulceration. From

Ecthyma, by the blebs at first containing serum, by the peculiar scab, and the subsequent deep ulcerations. In very severe cases, the secretion being from the first purulent, it may not be possible to distinguish rupia from ecthyma.

PROGNOSIS.—*Favorable*, except in the more severe cases of rupia escharotica.

TREATMENT—*Local*.—Warm baths ; alkaline baths ; emollient applications, and, if the ulcerations are obstinate, the application of nitrate of silver, dilute mineral acids, or stimulating ointments. *General*.—Tonics or stimulants, with alterations, according to the state of the patient ; and strict attention to diet, ventilation, and cleanliness : the treatment, in a word, of cachexia.

ORDER IV.

PUSTULÆ—PUSTULES.

VARIOLA Small-pox (p. 224).

VACCINIA Cow-pox (p. 230).

ECTHYMA.

IMPETIGO Running Tetter.

ACNE Copper Nose.

MENTAGRA Chin Welk.

PORRIGO.

EQUINIA Glanders.

ECTHYMA.

SYNONYMS.—*Farunculi atonici ; phlyzacia ; agria ; scabies fera.*

SYMPTOMS.—The eruption begins in the form of distinct inflamed circumscribed spots, which increase till they attain a considerable size. Pustules form on the center, and sometimes increase in size till they bear a close resemblance to the large bullæ of rupia. In two or three days the pustules dry up, leaving behind them thick scabs, and these falling off, leave a purple discoloration of the skin, or in severe cases, and in greatly impaired constitutions, an unhealthy ulcer. The eruption is sometimes accompanied by pain, and by slight febrile symptoms.

CAUSE—*Predisposing*.—Childhood, and old age. *Exciting*.—All the causes of cachexia.

DIAGNOSIS.—From *Acne*, *Impetigo*, *Sycosis*, and *Porrigio*, by the larger size of the pustules, and their inflamed and indurated base. From *Variola*, by their size and the absence of the central depression, and of contagion. From *Vaccinia*, by the

cellular structure of the latter, and its contagious nature. From *Syphilitic Eruptions*, by the history of the case, the accompanying symptoms, and the copper color of the eruptions. From *Furunculi*, by the common boil being an abscess of the cellular membrane, and not a pustule on an inflamed base. From *Scabies*, by the itch being originally vesicular.

PROGNOSIS.—The disease is not attended with danger, but sometimes resists treatment for a considerable period.

TREATMENT.—Emollient applications to the part, and, if the ulcers assume a chronic form, nitrate of silver, or the dilute nitric or muriatic acid, or stimulating ointments. Gentle aperients and alteratives, wholesome food, pure air, exercise, cleanliness, and the use of the sea-water bath, or of alkaline baths, as gentle stimulants to the skin.

IMPETIGO—RUNNING TETTER.

SYNONYMS.—Crusted tetter; cowrap.

SPECIES.—*Impetigo figurata*; *impetigo sparsa*; *impetigo larvalis*; *impetigo granulata*.

SYMPTOMS.—The eruption appears in the form of clusters of small pustules, slightly raised above the skin, which burst in from one to three days, and discharge a purulent fluid that hardens into the form of thick, yellow, semitransparent incrustations. These scabs rest on an inflamed base of an irregular shape, moistened by a sero-purulent fluid. The eruption sometimes disappears in a few weeks, but in other instances continues for months or years, the existing patches being succeeded by fresh groups of pustules. The disease is accompanied by some constitutional disturbance, and by intense heat and itching.

Impetigo figurata generally occurs in defined patches, on the face, and most commonly on the cheeks, but may attack any part of the body. It is most common in spring, and in young children, especially during dentition. *Impetigo sparsa* is more irregular in its distribution, and is most frequently seen on the extremities and around the joints. Its most common period is the autumn; and it may assume either an acute or chronic form. *Impetigo larvalis*.—This form is common in infants, and its usual seat is the scalp, ears, and lips. It may also occur on the cheek, which it covers with a thick yellowish-white crust, resembling a mask, whence its name. In one of its forms, it has received the name of *crusta lactea*. *Impetigo granulata*.—This form of the disease appears as a number of whitish-yellow pustules, each traversed by a single hair, accompanied by severe inflammation and itching, bursting in from two to four days, and pouring out an exudation of sero-purulent matter, which hardens into a hard, rough, brownish

crust. The scabs have a nauseous odor, and are sometimes found filled with lice. The disease is most common in uncleanly persons.

CAUSES—*Predisposing*.—The seasons of spring and autumn; infancy and childhood; the lymphatic temperament. *Exciting*.—The application of irritating substances to the skin; unwholesome diet; impure air; want of cleanliness; violent exercise; strong mental emotions. The disease is not contagious.

DIAGNOSIS.—The pathognomonic character is the formation of clusters of small pustules (psudracæ), succeeded by scabs of varying tints, from whitish yellow to dark brown. From *Eczema*, by the primary form of impetigo being pustular, and by the thick scab of the latter, contrasted with the thin, scaly crust of the former. When it attacks the chin, from *Sycosis*, by the larger size of the pustules of the latter, and by the less copious exudation. From *Porrigio*, by the latter being contagious, and destroying the hair, and by the peculiar character of the scab. (See *Porrigó*.)

PROGNOSIS.—*Favorable* in the young and in its acute forms. Obstinate and difficult of cure in the old and in chronic forms. It is unattended with danger.

TREATMENT.—In cases of unusual severity, general blood-letting, or the application of leeches near the seat of the disease, with antiphlogistic remedies, may be required. In less severe forms of the disorder, emollient applications, tepid baths, the vapor douche, and gentle aperients. In chronic impetigo, in addition to tepid baths, alkaline lotions to the skin; the sulphur bath; the dilute acids, or a weak solution of nitrate of silver. Stimulating ointments may also be usefully applied. In obstinate cases, Fowler's solution.

ACNE—COPPER NOSE.

SYNONYMS.—*Varus*; *gutta rosea*.

SPECIES.—*Acne simplex*; *acne indurata*; *acne rosacea*.

SYMPTOMS.—This disease attacks the sebaceous follicles of the skin, and appears in the form of isolated pustules, seated on a hard, red base, and terminating in indolent chronic tumors. It is most commonly seen on the nose, cheeks, temples, and forehead, but frequently makes its appearance on the back and upper part of the chest, and sometimes on the neck and shoulders. The three varieties are often to be seen at the same time on the same person. It is essentially chronic, and not accompanied by constitutional symptoms; is most frequent from puberty to the age of thirty-five, and occurs in both sexes.

Acne simplex answers to the foregoing description, its most

common situation being the shoulders and upper part of the chest. *Acne indurata* is characterized by the formation of large indurated tumors by the union of several of the smaller follicles. Its most common seat is the face, but it often occupies the back of the trunk. *Acne rosacea* is most frequently met with in old persons, and its most common seat is the nose. As the name implies, the disease is attended with a rosy color of the skin, which, however, is not permanent.

DIAGNOSIS.—This is rendered easy by bearing in mind the small-sized pustule situated on the hardened base; and the diagnosis will often be assisted by the situation of the disease.

PROGNOSIS.—In *Acne simplex*, favorable. It often disappears of itself with the advance of age. *Acne indurata* is often very obstinate, and defies all modes of treatment; and the same is true, in a still greater degree, of *Acne rosacea*.

TREATMENT.—In young and vigorous subjects, a restricted diet, and the avoidance of all stimulating liquors; gentle aperients, and, in extreme cases, general blood-letting. In chronic cases, and in *Acne indurata*, the same general treatment, varied according to the constitution and state of the patient, with spirit lotions, or lotions of the acetate of lead, or frictions with an ointment of iodide of sulphur, in the proportion of a scruple of the iodide to an ounce of lard. Dilute acids or the nitrate of silver cautiously applied to the eruption. *Acne rosacea* requires a very careful regulation of the diet, abstinence from stimulating liquors, and proper exercise.

MENTAGRA—SYCOSIS—SKIN WELK.

SYMPTOMS.—Redness, heat, and a sense of tension of the skin, of the chin or upper lip, followed by an eruption of small red points, which, in the course of a day or two, ripen into distinct pointed pustules, traversed by a single hair. After five or six days more, the pustules burst, discharge their contents, and form thin brownish scabs, which fall off, and are sometimes not renewed, the disease terminating in from ten days to a fortnight. The eruption is attended with a smarting pain. When the disease has continued for some time, the beard falls off.

CAUSES.—*Predisposing*.—The male sex; youth; the seasons of spring and autumn. *Exciting*.—Irritants; heat; neglect of cleanliness. Contagion?

DIAGNOSIS.—The situation of the eruption distinguishes it from many diseases. The small pointed pustule, on a hard base, will serve to distinguish sycosis from other diseases attacking the same part.

PROGNOSIS.—*Favorable*, but guarded. It is often very obstinate.

TREATMENT.—Emollient fomentations, cooling drinks, and laxatives, when the disease is acute. In extreme cases, more severe antiphlogistic remedies may be necessary. The hair should be cut with scissors. In chronic cases, and when the tubercles are large, frictions, with stimulating ointments, or the local application of the dilute acids or a dilute solution of lunar caustic. The vapor bath or douche may also be used with advantage. Mercury as an alterative, and the preparations of iron, have been found useful.

PORRIGO.

SYNONYM.—Tinea.

SPECIES.—*Porrigo favosa*; *porrigo scutulata*.

SYMPTOMS.—Small, contagious pustules, seated on the hairy scalp, occurring generally in childhood, but not confined to young persons. The pustules are small and round, contain a yellow matter, which concretes so as to form a hard, prominent scab, presenting a central depression. There are no febrile symptoms.

Porrigo Favosa.—This form is not confined to the scalp, but may attack the chin, eyebrows, or forehead, and in rare instances the trunk or extremities. Its chief characteristic, when fully formed, is the peculiar thick yellow scab, marked by numerous depressions, and bearing some resemblance to a honey-comb. The *porrigo scutulata*, or ringworm, like the foregoing, occurs chiefly on the scalp, but is sometimes seen on the forehead and neck, and still more rarely, as the result of direct contact, on other parts of the body. It is arranged in the form of rings, inclosing a center which is less thickly covered with pustules. The hair ultimately falls off from the part affected, leaving a shining bald patch. When the disease is of some duration, it may be seen at the same time in all its stages—the red patches, the cluster of yellow pustules, crusts of various thickness, and bald spots. When the disease has disappeared, the hair is slowly reproduced, and sometimes is never replaced.

CAUSES.—*Predisposing.*—Scrofula. *Exciting.*—Contagion.

DIAGNOSIS.—The contagious character of the eruption, the clustered pustules, the rough pitted scab, and the subsequent baldness, will serve to distinguish this disease from others. The form of the eruption distinguishes *porrigo scutulata* from *porrigo favosa*, and from most other cutaneous diseases.

PROGNOSIS.—The disease is often obstinate and of long duration.

TREATMENT.—The hair must be first cut close, or shaved off, the head must be well washed, and the scabs must be softened with warm fomentations or poultices. The best local ap-

plication, in the great majority of cases, is the iodide of sulphur ointment; when this does not prove successful, a strong solution of nitrate of silver, or the dilute mineral acids, or creasote, may be used. Several other forms of stimulating washes and ointments have also been recommended, which it is not necessary to specify.

EQUINIA—GLANDERS—FARCY.

SYMPTOMS.—The disease generally sets in with pain in the head, back, and limbs, nausea, thirst, great prostration of strength, and stiffness and pain in the joints, increased by motion. These symptoms are followed, after a short but variable interval, by redness, heat, swelling, and excoriation of the nose, lips, and cheeks; the eyes are inflamed, and the eyelids swollen; there is a profuse discharge of a yellow or sanious fluid from the nostrils; and pustules appear on different parts of the body. These local symptoms are accompanied by a hot skin, urgent thirst, frequent, weak, and irregular pulse, and feeble respiration. The tongue is covered with a dark fur; the skin is bathed in a profuse and offensive perspiration; the evacuations are slimy and fetid. These symptoms increase in severity, and are followed, after a few days, by diffused abscesses in different parts of the body, especially about the joints; typhoid symptoms rapidly supervene; the nose and lips become gangrenous; the discharges extremely offensive; low muttering delirium sets in, and death takes place by collapse.

In farcy, the pustules are accompanied by small red tumors on different parts of the body, which rapidly change to a dark brown color, become extremely painful, and exude, from small cracks on their surface, a thin, acrid sanies. If the disease is the result of inoculation, a pustule forms on the site of the injury, and is succeeded by an unhealthy ulcer, and by inflammation of the absorbents and absorbent glands. This modification runs a more chronic course than glanders.

ANATOMICAL CHARACTERS.—Besides the pustules and tumors on the surface, congestion of the mucous membrane of the nose, fauces, air passages, and alimentary canal; congestion of the lungs; phlebitis; purulent deposits in the lungs and joints; diffused abscess in the cellular membrane; and sero-sanguinolent fluids in the serous cavities.

CAUSES.—Contagion and infection. The disease originates in quadrupeds, and is most commonly communicated from the horse to the human subject.

DIAGNOSIS.—This presents no difficulty. The seat and character of the pustules, and the history of the case, prevent it from being confounded with any other disease.

PROGNOSIS.—Highly unfavorable. The disease is generally and speedily fatal.

TREATMENT.—No remedy has yet been discovered. The treatment must be that of typhus fever. Those who are employed in grooming horses affected by glanders should wear gloves, avoid contact with the diseased animal, and practice scrupulous cleanliness.

ORDER V.

PAPULÆ—PIMPLES.

LICHEN.

PRURIGO.

LICHEN.

SYNONYMS.—Papulæ sicca; scabies sicca vel agria.

SPECIES.—Lichen simplex; lichen strophulus; lichen urticatus; lichen agrius.

SYMPTOMS.—This disease consists in an eruption of small, hard pimples, sometimes of the color of the skin, sometimes red, generally arranged in patches or clusters, and accompanied by severe itching. Its most common situations are the hands, forearms, neck, and face, but it may attack other parts of the body. It is generally a chronic disorder, but sometimes assumes an acute form. Its usual termination is in desquamation.

Lichen simplex answers to the foregoing description. *Lichen strophulus*, commonly known as *red gum*, *white gum*, or *tooth rash*, attacks children at the breast, or during the process of dentition, is an acute affection, and generally continues for three or four weeks. It has received many names, according to the arrangement of the pimples and the color of the skin. *Lichen urticatus* is characterized by the large size of the papulæ, and their close resemblance to the sting of nettles. In *lichen agrius*, the papulæ are confluent and seated on a highly inflamed base; the pimples ulcerate and discharge a sero-purulent fluid, which dries into small scabs, and these, falling off, are replaced by thin scales. It is accompanied by intense smarting pain.

CAUSES.—*Predisposing.*—The seasons of spring and summer. *Exciting.*—Extreme heat; irritants applied to the skin; abuse of ardent spirits; grief; disorders of the stomach and bowels; and in children, the irritation of teething.

DIAGNOSIS.—The papular form of the eruption, the severe itching, and its non-contagious character, serve to distinguish this disease from most others. It is distinguished from prurigo by the pimples in the latter disease being larger and flatter, and generally torn and covered with a minute clot of blood.

PROGNOSIS.—Lichen is not dangerous, but troublesome, and sometimes difficult of cure.

TREATMENT.—In its acute forms, and especially in severe cases of lichen agrius, general blood-letting is sometimes required, with low diet, brisk aperients, and the antiphlogistic regimen, and tepid and emollient applications to the skin. Chronic cases require stimulating washes and ointments. In very obstinate cases, Fowler's solution may be necessary.

PRURIGO—PRURITUS.

SPECIES.—Prurigo mitis; prurigo formicans; prurigo senilis.

SYMPTOMS.—A chronic disease, in which the papulæ are of the color of the skin, larger than those of lichen, and accompanied by intolerable itching. It may occur on any part of the body, but is most frequently met with on the neck and shoulders. In some instances, it is confined to one spot, such as the external parts of generation in both sexes, the verge of the rectum, &c. In consequence of the friction, the papulæ are apt to be torn, and to present on their summit a minute clot of blood, which gives to the eruption a very characteristic appearance.

Prurigo mitis presents a smaller-sized pimple than the *prurigo formicans*, and is attended with less itching. In the latter disease, the itching is greatly increased by the warmth of bed. *Prurigo senilis* or *pedicularis* is accompanied by greater dryness of the skin, and characterized by the presence of large numbers of minute insects.

CAUSES.—*Predisposing*.—Childhood and old age, and the seasons of spring and summer. *Exciting*.—All causes of debility, and cachexia; want of cleanliness, unwholesome food, privation, grief, friction, irritation of the skin, or of the mucous membranes.

DIAGNOSIS.—From *Lichen*, by the larger size of the pimples, by the dark spot on their surface, and by the more severe itching.

PROGNOSIS.—Not dangerous; but very difficult of cure, especially in aged persons.

TREATMENT.—In cases of prurigo mitis and formicans, tepid baths, gentle aperients, with antimonials; and in very severe cases an antiphlogistic regimen. In prurigo senilis the sulphur bath is the best remedy. There is no hope of cure but in stimulating applications, of which this is the best.

ORDER VI.

SQUAMÆ—SCALES.

LEPRA VULGARIS		Scaly Leprosy.
PSORIASIS.		
PITYRIASIS		Dandriff.
ICHTHYOSIS		Fish-skin.

LEPRA VULGARIS—SCALY LEPROSY.

SPECIES.—*Lepra alphoides* ; *lepra nigricans*.

SYMPTOMS.—The eruption begins in the form of small red shining spots, slightly raised above the skin, and becoming soon covered with a thin scale, which falling off, leaves the surface of the skin red and slightly crusted. The spot increases in size, still retaining its circular form, and is covered by a thicker scale, raised at the circumference, and depressed toward the center. These patches, when fully formed, vary in size, from that of a shilling to that of a five-shilling piece. Their most common situation is the neighborhood of the large joints, especially the knees and elbows, but they may appear on any part of the body, with the exception generally of the face and hands. The disease is essentially chronic, but disappears and returns without obvious cause.

Lepra alphoides is characterized by the small size, and the silvery scales which cover the patches. *Lepra nigricans* is a rare disease, distinguished chiefly by its darker color.

CAUSES.—*Predisposing*.—The season of autumn ; male sex ; adult age. *Exciting*.—Irritation of the skin ; strong mental emotions ; salt meat.

DIAGNOSIS.—From *syphilitic Lepra*, by the copper or violet-color of the skin in the latter, and the thin, shining, and imperfect scales. From *Porriago*, by the situation, which in the case of *lepra* is rarely on the scalp, and by the distinct scaly character as distinguished from the small pustules of *porriago*. From *Psoriasis*, by the more irregular shape of the patches in the latter, and by the center being raised instead of the circumference, as in *lepra*.

PROGNOSIS.—It is unattended with danger, but obstinate and difficult of cure.

TREATMENT.—In young and vigorous persons, and in recent cases, the antiphlogistic treatment and regimen, with tepid baths. In chronic cases and in old persons, a course of tonics, frictions with the iodide of sulphur ointment, sulphur and salt-water baths ; and if the disease resist this treatment, prepara-

tions of arsenic, or tincture of cantharides internally. The iodide of arsenic (the tenth of a grain three times a day), and the vapor of sulphur and iodine, are strongly recommended by Dr. Burgess. The following is the formula for the sulphur and iodine fumigation: Sulphuris, ʒiij. ; hyd. sulph. rubri, ʒiij. ; iodinii, gr. x., in six powders. The vapor to be applied by means of a tin box or jar to the part affected.

PSORIASIS.

SPECIES.—*Psoriasis guttata*; *psoriasis diffusa*; *psoriasis inveterata*; *psoriasis gyrata*.

SYMPTOMS.—A chronic affection of the skin, consisting of irregular patches of various size, slightly raised above the surface, and covered with a white scale. They are attended with some degree of itching, especially at night, but by no marked constitutional disturbance.

Psoriasis guttata appears in small, distinct, round red patches, generally in the adult, and is often combined with the other forms. *Psoriasis diffusa* is more irregular both in shape and size. The patches are often of considerable extent, and commonly situated on the limbs, and in severe cases they are marked by large fissures. *Psoriasis inveterata* is a very severe form of the disease, and generally occurs in old persons, and in debilitated habits. The skin, in the progress of the disease, becomes hard, thickened, and covered with a shining scale, which, when removed, leaves a red, fissured, painful, and bleeding surface. *Psoriasis gyrata* occurs in spiral-shaped stripes, generally on the back. It is of very rare occurrence. *Psoriasis* occurs on the eyelids, lips, prepuce, scrotum, backs and palms of the hands, and nails, and has received names from these several situations. *Psoriasis palmaris* is one of its most frequent varieties.

CAUSES.—*Predisposing.*—Adult age; spring and autumn; scrofula. *Ecciting.*—Abuse of spirituous liquors; unwholesome food. It is not contagious.

DIAGNOSIS.—From *Lepra* (see *Lepra*). From syphilitic lepra, by the peculiar color of the latter.

PROGNOSIS.—A very obstinate and intractable disease, especially in old persons and debilitated constitutions.

TREATMENT.—That of lepra. (In a very severe form of *psoriasis inveterata*, occurring in a middle-aged female in delicate health, the disease was speedily cured by arsenite of iron, in the dose of a twelfth of a grain three times a day, cautiously and slowly increased to a sixth.—G.)

PITYRIASIS—DANDRIFT.

SPECIES.—*Pityriasis capitis*; *pityriasis rubra*; *pityriasis versicolor*; *pityriasis nigra*.

SYMPTOMS.—The disease consists of a superficial chronic inflammation of the skin, accompanied by abundant desquamation, which is constantly renewed. Its most common seat is the scalp, but it attacks other parts of the body. There is a slight itching of the skin in some cases. The disease is chronic, and not accompanied by any constitutional disturbance.

Pityriasis capitis occurs at all ages, and often in new-born infants. It is a very slight affection, but frequently of long duration. It is accompanied by slight itching, and friction detaches numerous white branny scales. *Pityriasis rubra* is distinguished from the foregoing by the red color of the skin. The colored portions are small spots, which coalesce and extend gradually over large portions of the surface. In *pityriasis versicolor*, the color of the skin is yellow in place of red, and the skin is covered, as in the other species, by an abundant fur. *Pityriasis nigra*, as the name implies, is characterized by a dark color of the skin.

CAUSES.—Irritation of the skin by heat, by the strong rays of the sun, or by chemical or mechanical irritants.

DIAGNOSIS.—The abundant branny scales on an efflorescence consisting of an aggregation of small circular spots of a red, yellow, or black color, distinguish this from all other diseases of the skin.

PROGNOSIS.—Unattended with danger, but obstinate and difficult of cure.

TREATMENT.—Cleanliness; tepid baths; local stimulants to the skin, and tonics and alteratives; alkaline lotions and sulphurous baths are among the best local applications.

ICHTHYOSIS—FISH SKIN.

SYMPTOMS.—This disease consists in the formation over the whole body, or on certain parts only, especially the palms of the hands, soles of the feet, face, eyelids, outer surface of the limbs, and around the joints, of a number of small, hard, thick, dry brown scales, overlapping each other, like the scales of a fish, without any accompanying inflammation, pain, or itching of the skin, and often attended with a very disagreeable odor.

CAUSES.—Obscure; hereditary predisposition. The disease is generally congenital.

DIAGNOSIS.—It does not admit of being confounded with any other disease.

PROGNOSIS.—Not attended with danger; but when hereditary, incurable, and when not hereditary, very obstinate.

TREATMENT.—The local treatment most likely to be of service is the vapor bath, and strong stimulants to the skin, such as blisters, caustics, the vapors of sulphur and iodine. The internal remedies indicated are arsenic, or some of its combinations, of which the best is the iodide of arsenic.

ORDER VII.

TUBERCULÆ.

LEPRA TUBERCULOSA . . . Elephantiasis.

FRAMBCESIA The Yaws.

MOLLUSCUM.

LEPRA TUBERCULOSA—ELEPHANTIASIS.

SYNONYMS.—Elephantiasis Græcorum; lepra Egyptiaca; lepra Hebræorum.

SYMPTOMS.—The disease commonly sets in with erythematous patches, upon which an eruption of soft, livid tumors of variable size and irregular shape makes its appearance. The skin and the subjacent tissues are hypertrophied and œdematous, and the parts affected ultimately attain an enormous size. The sensibility of the skin is at first heightened, but subsequently diminished. In very severe cases of the disease the tubercles become inflamed and ulcerated, and discharge an offensive sanies, which concretes into black scabs. The adjoining textures, even to the bones, sometimes become implicated, and their structure completely changed. The constitutional symptoms are not well marked, and are merely such as result from the prolonged sufferings of the patient. The disease may occur on any part of the body, but the most common situations are the lower extremities and face.

CAUSES—*Predisposing.*—Hereditary taint; the causes of scrofula. *Exciting.*—Obscure.

DIAGNOSIS.—The disease can not be easily confounded with any other.

PROGNOSIS.—Generally unfavorable.

TREATMENT.—Stimulating applications externally, and arsenical preparations or cantharides internally, in combination with tonic infusions. Change of climate is sometimes beneficial.

FRAMBCESIA—THE YAWS.

SYMPTOMS.—The disease sets in without any marked premonitory symptoms, in the form of clusters, of variable size and shape, of small, dark red spots resembling flea-bites. Upon these spots papulæ are developed, which degenerate into indolent vegetations, resembling, when they are found in circu-

lar groups, raspberries or mulberries. These vegetations are firm, slightly inflamed, and covered with thin dry scales. In some instances they become the seat of ulceration, and of a yellow or bloody discharge, which concretes into scabs. The skin around the seat of the eruption is generally indurated.

CAUSES.—*Predisposing*.—The climate of the West Indies, and of parts of America and Africa; scrofula. It is very rare among the white population. *Exciting*.—Contagion?

DIAGNOSIS.—The appearance of the disease is such as to prevent its being confounded with any other contagious disease.

PROGNOSIS.—Generally favorable. It sometimes assumes a chronic form, and continues for years.

TREATMENT.—The local application of stimulating ointments, as the binirate, protiodide, or biniodide of mercury, caustic, arsenic, or the actual cautery. Internally, tonics and alteratives, and mercurial preparations in small doses. In chronic cases, arsenic. Warm and vapor baths and douches may also be used with advantage.

MOLLUSCUM.

SYMPTOMS.—Numerous indolent tubercles, from the size of a pea to that of a pigeon's egg, of various forms, sessile or pedunculated, of the natural color of the skin, containing an atheromatous matter, unaccompanied by any constitutional disorder, and not attended by pain, inflammation, or ulceration. They may occur on any part of the body, make their first appearance in childhood, and generally continue during the whole of life.

CAUSES.—Obscure. One form of the disease is contagious.

TREATMENT.—Fowler's solution was administered by Bate-man with success; and Biett has employed a solution of sulphate of copper with advantage.

ORDER VIII.

MACULÆ—SPOTS.

The diseases belonging to this order are of so little practical importance, that a very short notice of them will suffice. They consist either in change of color (colorationes) or loss of color (decolorationes). To the former belong the common freckle (lentigo), the mole (spilus), the several forms of nævus, and the liver-spot (ephelis); to the latter, the universal colorless state of the skin (albinismus), and the partial absence of color (vitiligo). The only disease of this class requiring a distinct notice, with the exception of nævus, of which the treatment belongs to the surgeon, is ephelis.

EPHELIS—LIVER-SPOT.

SYNONYMS.—Cloasma ; pannus hepaticus.

SYMPTOMS.—The eruption is preceded and accompanied by slight itching. It consists of small round spots of a grayish or yellowish tinge, which increase in number, and coalesce so as to cover a large surface of the skin. It may be transient, or assume a chronic form, and continue for some months. Their most common seats are the forepart of the trunk, but they sometimes appear on the face.

CAUSES.—The action of the sun ; errors in diet ; suppression of accustomed discharges. Diseases of the liver ?

DIAGNOSIS.—Ephelis is easily distinguished, by its being a mere discoloration of the skin, without the formation of any distinct scale.

PROGNOSIS.—*Favorable*.—The disease is rarely of long continuance, and generally disappears without treatment.

TREATMENT.—The general treatment will consist in a regulation of the diet, with gentle aperients and alteratives, and a course of sulphureous waters. The local treatment, in slightly stimulating washes, of which the sulphuret of potash (one ounce in a quart of water) is the best.

LUPUS.

SYNONYMS.—Lupus vorax ; herpes exedens ; formica corrosiva.

SPECIES.—Superficial, deep seated, and tubercular lupus.

SYMPTOMS.—This disease, in all its forms, is characterized by its tendency toward destructive ulceration of the parts which it attacks. Its most common point of attack is the nose ; but it may occur on other parts of the face, and very rarely on the trunk or extremities.

The *superficial* form of lupus is sometimes confined to the skin, from which the cuticle exfoliates, and leaves the true skin red and shining, and tender to the touch, and bearing a close resemblance to the recent scar of a superficial burn. The redness disappears on pressure. When the disease is arrested, it leaves the skin thin and shining, and as if seared by a hot iron. In other instances the disease is tubercular. Numerous small, soft red tubercles make their appearance, which remain stationary for a few weeks, months, or years, till they suddenly become inflamed and enlarged ; their bases unite, and their summits ulcerate, forming an irregular spreading ulcer, covered by a dark, tenacious crust. The parts first attacked sometimes partially heal, leaving irregular cicatrices, which become the seat of fresh tubercles and of renewed ulceration. The most common seat of this form is the cheek,

but it may occur on the neck and chest, and on the anterior surface of the extremities.

The *deep-scated* form of the disease generally attacks the alæ of the nose, and is often preceded by redness, swelling, and mucous discharge from the nostrils. A small ulcer soon forms, which is covered by a scab, beneath which a gradual destruction of the part takes place, first of the skin, and then of the cartilages of the nose; the part is often extremely painful. In extreme cases, the whole nose, and even the palate and gums, is destroyed; but in some instances the disease lasts for years without occasioning any great amount of destruction.

Lupus with hypertrophy is generally confined to the face, and consists in the formation of numerous soft, indolent tumors, which rarely ulcerate, but enlarge at their bases, and the skin and cellular tissue become hypertrophied. The entire face, in this manner, sometimes attains an enormous size, and is hideously disfigured.

These forms may exist together, leading to the destruction of the nose, eyelids, and lips, and producing very great deformity. They are rarely accompanied by any marked constitutional symptoms.

CAUSES.—*Predisposing*.—The period of childhood, youth, and early manhood; the scrofulous diathesis. *Exciting*.—Obscure. It is not contagious.

DIAGNOSIS.—From *Acne*, by the indurations of the latter being preceded by pustules. From *tubercular Lepra*, by the insensibility of the skin, and the peculiar fawn color of the tubercles in this latter disease. From *Cancer*, by the latter beginning in a single point, surrounded by a hard, circumscribed base, and accompanied by severe darting pains; the ulcers presenting a fungous appearance. From *Syphilis*, by the peculiar copper tinge of the eruption, and the coexistence of other secondary symptoms. From *Impetigo*, by the character of the crusts, which in lupus are dark brown, thick, and adherent; in impetigo, yellow, rough, and loosely attached.

PROGNOSIS.—*Favorable* when recent and limited. *Unfavorable* when of long continuance and extensive.

TREATMENT.—This must be chiefly local, and will consist, where the ulceration has not set in, of friction with stimulating ointments, such as the iodides of mercury or sulphur. When ulceration has set in, caustics must be used, such as nitrate of silver, caustic potass, the chlorides of antimony or zinc, the nitrates or iodides of mercury, and the preparations of arsenic; the animal oil of Dippel has also been recommended. The best applications contain arsenic. A powder which bears the name of Dupuytren, consists of one or two

parts of arsenious acid to an ounce of calomel, and is to be applied in small quantity to a limited surface of the skin. The arsenical powder of Frère Côme is a more powerful remedy, and consists of arsenious acid, ten grains; sulphuret of mercury, two scruples; animal charcoal, ten grains. It must be used with caution, and applied to a small surface at a time.

CHELOIDEA.

SYNONYMS.—Cancroide; keloide.

SYMPTOMS.—This is a rare disease, appearing as small, hard, indolent tubercles, generally isolated; but sometimes occurring in groups, with intervals of sound skin between them; they are of an irregular oval, square, or angular shape, of a rose or a red color, with a depressed center, and covered with a thin layer of wrinkled cuticle, and having a remote resemblance to a crab or tortoise; whence its name. The usual situation of these tumors is the space between the mammæ. They are generally chronic, and unattended with danger.

DIAGNOSIS.—From *Cancer*, by the small, round, livid tumor, surrounded by dilated veins; and, in its more advanced stage, by the open ulcer and the enlarged lymphatic glands.

TREATMENT.—The local application of the sulphurous douche, of plasters containing iodine, or iodine and opium, and alkaline baths.

SYPHILIDA—SYPHILITIC ERUPTIONS.

Syphilitic eruptions may assume a great many different forms. They may be exanthematous, vesicular, pustular, tubercular, papular, or scaly; and they may occur either soon after infection—in which case they are usually accompanied by other constitutional symptoms, and are termed *primary*—or they may come on after an interval more or less considerable, and then they are termed *secondary*. The appearances which distinguish the several syphilitic eruptions from those which most nearly resemble them are, *the color*, which is coppery, and most distinctly perceived on putting the skin on the stretch; *the form*, which is generally circular; and *the situation*, which is most commonly the face, forehead, and nose, and the back and shoulders. The scales, where they exist, are of a dusky color, thin, and dry; and the scabs, of a greenish tint, thick, dry, and cracked.

If the appearance of the eruption is not sufficiently characteristic, our diagnosis will often be materially assisted by the history of the case, and by the symptoms which have preceded or accompanied it. The most common accompaniments of the syphilidæ are, ulcerations of the tonsils or palate; periostitis, which attacks chiefly the tibia, ulna, and bones of the skull; and iritis. Ulcers of the sides of the tongue and the

thickening of the mucous membrane covering its surface are less common accompaniments.

The treatment of syphilitic eruptions consists in the cautious use of the protochloride or bichloride of mercury, or the iodide of potassium in full doses. The protiodide of mercury is also an excellent medicine in obstinate cases. The muriate of gold (dose, one tenth of a grain), and the subcarbonate of ammonia, in full doses, may be mentioned among the remedies which have been used with success. Among local applications, which are chiefly required in the tubercular form, may be mentioned the protonitrate, and the iodides of mercury, in the form of ointment, and the iodide of sulphur. Warm vapor and sulphur baths and douches may also be used with advantage. In very severe cases, opium in full doses may be advantageously combined with the other remedies; and when the skin is very irritable, lotions containing the cyanide of potassium. It is usual to administer guaiacum, sarsaparilla, or mezereon in secondary cases; but these remedies ought to be made subsidiary to the more powerful and certain preparations of mercury or iodine.

GENERAL OBSERVATIONS ON DISEASES OF THE SKIN.

In consequence of the great variety of skin diseases, the minute differences which distinguish some of their forms from those most nearly allied to them, the different appearances exhibited by the same disease in different stages of its course, and the difficulty occasionally experienced in distinguishing even those belonging to different orders when the characteristic appearances have been effaced by friction, or supervening inflammation, render it particularly necessary to lay down such general rules of treatment as it may be possible to frame for all diseases of the skin, by whatever name they are known. Such general observations must, of course, be received and acted on with the reserve which should always characterize the application of general rules to particular cases.

There is one class of skin diseases, the febrile exanthemata (of which the more important have been described in Chapter III. of this work), which run their appointed course, and can be treated only by remedies affecting the system at large. There is a second class of skin diseases which, though not usually accompanied by severe general symptoms, require constitutional remedies, namely, the several syphilitic eruptions, which are removed by the same remedies that cure other secondary symptoms, viz., the preparations of mercury and iodine. In the majority of these cases no local remedies will be required; but should they be deemed necessary, the same principles will guide us in our selection which preside over the

choice of local remedies in other diseases of the skin. As these diseases are essentially chronic, stimulant applications are indicated, and of these the best will be such as assist us in our general treatment, viz., the preparations of mercury or iodine. Another class of skin diseases also requires constitutional treatment—those which occur in scrofulous constitutions or in impaired states of health—that treatment being such as would be adopted in scrofula, whatever form it assumes, and in similar impaired states of constitution. The local treatment will, in such cases, be governed by the same general principles which apply to similar states of skin. A fourth class of skin diseases requiring constitutional treatment consists of those in which, whatever may be the form of the eruption, the skin is the seat of inflammation. In all such cases, those remedies are indicated which are effectual in the cure of inflammation of other parts. Of all these remedies, the most effectual is tartar-emetic in the dose of an eighth of a grain or more, either alone or in combination with one or two grains of hydrarg. c. cretâ. A fifth class of cases requiring constitutional treatment consists of those obstinate chronic diseases of the skin which are found to resist all local applications, and the more simple constitutional remedies, such as aperients, alteratives, and tonics. In such cases, experience has shown the great benefit to be derived from small doses of arsenic or tincture of cantharides, which probably act by inducing a peculiar condition of the capillary vessels.

These are the five leading cases of skin disease which especially require constitutional treatment. The general remedies administered in other cases will depend upon the age and existing state of health. In the young and robust, mild antiphlogistic treatment and regimen; in the aged and feeble, tonics or stimulants, according to the degree of the existing debility, and the more or less advanced age of the patient.

In all cases of skin disease it is important to attend to the state of the digestive organs. The bowels should be kept free, and alterative remedies should be given, if the functions of the liver are sluggishly performed; and dyspepsia must be met by the remedies appropriate to its existing form.

The *local* treatment of skin diseases must be regulated, where no particular application is recommended by experience, by the presence or absence of marks of severe inflammatory action. Where much inflammation is present, cooling washes and ointments will be required; but when inflammation is absent, an opposite plan of treatment is necessary, and we must endeavor to establish common inflammation by the aid of stimulant ointments and washes, in the hope of superseding by this means the peculiar and often languid action of

the vessels. This plan of treatment proves effectual in the several forms of porrigo affecting the scalp; and in the form of the sulphur bath it has cured chronic affections of the skin, when all other remedies have failed. When there is extreme irritability of skin, with or without inflammation, sedative lotions, such as the decoctum dulcamaræ, or applications containing prussic acid, may be used with advantage. There is one disease, scabies, which depends on the presence of a peculiar insect, the *acarus scabies*, which is destroyed by sulphur and by other strong stimulants.

For more minute information on the treatment of the several skin diseases, the reader is referred to works written expressly on that subject. As it is one which can scarcely be understood without the aid of plates, any minute detail would be of little use in this place, even if the limits of this work allowed of its insertion.

FORMULÆ.

The doses are those for the adult, unless otherwise stated.

STIMULANTS.

1. GENERAL STIMULANTS (including Stimulant Antispasmodics).

In the form of Draught.

- | | |
|---|---|
| <p>R. Ammonizæ sesquicarb. gr. vj.
 Spirit. æther. sulph. comp. f3j.
 Misturæ camphoræ f3x.
 Sirupi zingiberis f3j.
 Fiat haustus quartis horis sumendus.</p> <p>R. Ammon. sesquicarb. gr. v.
 Liq. ammonizæ acetatis f3iij.
 Misturæ camphoræ f3i.
 Sirupi aurantii f3j.
 Fiat haustus secundâ vel tertiâ quâque horâ adhibendus.</p> <p>R. Misturæ camph. f3xij.
 Liqueor. ammon. acetatis f3iij.
 Spirit. ammon. com. ℥xx.
 Sirupi aurantii f3j.
 Fiat haustus sextâ quâque horâ sumendus.</p> <p>R. Spirit. ammon. comp. f3ss.
 Tinct. cardamomi comp. f3ij
 Aquæ pimentæ f3i.
 Sirupi f3j.
 Fiat haustus, sextis horis sumendus.</p> <p>R. Ammon. sesquicarb. gr. x.
 Spirit. myrist.
 Syr. aurantii aa 3i.
 Aquæ destil. 3i.
 M. fiat haustus cum succi limonis cochl. j. magno inter effervescentiam sumendus.</p> <p>R. Spirit. armoracizæ comp. f3ss.
 Spirit. ammon. foetid. ℥xv.
 Tinct. valerianæ ammon. f3ss.
 Aquæ pimentæ f3vi.
 Sirupi f3j.
 Fiat haustus quartâ quâque horâ sumendus.</p> <p>R. Creasoti ℥i.
 Mist. camph. 3i.
 Fiat haustus. (In obstinate vomiting without organic disease, and in sea-sickness. The dose may be gradually</p> | <p>increased; in which case the quantity of the menstruum must be at least 3ss. to each drop of creasote.)</p> <p>R. Radicis serpent. contusæ 3ss.
 Corticis cascari. contusæ 3iij.
 Aquæ feventis Oj.
 Macera in vase clauso per horam, dein cola.</p> <p>R. Infusionis hujus f3x.
 Tincturæ aurantii f3jss.
 Sirupi aurantii f3j.
 Misce pro haustu quartâ quâque horâ sumendo. (In typhus and in typhoid states of system.)</p> <p>R. Decocti cuspariæ f3xiv.
 Tinct. cinchonæ comp. f3j.
 Confectionis aromaticæ 3j.
 Sirupi aurantii f3j.
 Fiat haustus quartis horis sumendus. (Ibid.)</p> <p>R. Misturæ camphoræ 3x.
 Spirit. æther. sulph.
 Spirit. lavand. comp. aa 3i.
 M. fiat haustus tertiis vel quartis horis adhibendus.</p> <p>R. Ol. terebinth. pur. 3i.
 Mellis 3ii.
 Spt. lavand. comp. 3ss.
 Pulv. acaciæ q. s.
 Aquæ 3i.
 M. fiat haustus sextis vel quartis horis sumendus.</p> <p>R. Tinct. cinchonæ c. f3j.
 Tinct. valerianæ ammon. ℥xx.
 Infus. quassizæ f3xij.
 Fiat haustus ter in die sumendus.</p> <p>R. Spt. Ammon. comp. f3ss.
 Tinct. cinchonæ comp. f3jss.
 Decocti cinchonæ f3j.
 Sirupi rheados f3j.
 Fiat haustus quartâ quâque horâ sumendus.</p> |
|---|---|

- R. Floris arnicæ montanæ ʒj.
Aque ferventis fʒx.
Macera per horam in vase clauso et cola.
Liquoris colati fʒx.
Tincturæ zingiberis fʒij.
Sirupi ejusdem fʒj.
Fiat haustus quartis horis sumendus.
- R. Guaiaci pulverisati gr. x.
Tinct. guaiaci ammoniatæ fʒj.
Pulveris acaciæ ʒij.
- Sirupi croci fʒjss.
Aque pimentæ fʒxiiij.
Fiat haustus sextis horis sumendus.
(In chronic rheumatism.)
- R. Solutionis calcis chlorureti ʒi.
Mucilaginis acaciæ.
Sirupi aurantii aa ʒii.
Aque destill. ʒi.
M. fiat haustus secundâ vel tertiâ quâque horâ sumendus. (In typhus fever and dysentery.)

In the form of Mixture.

- R. Ætheris rectificati fʒij.
Misturæ camphoræ fʒvij.
Sirupi croci fʒss.
Fiat mistura: sit dosis cochlearia tria ordinaria.
- R. Spirit. æther. sulph. comp. fʒijij.
Misturæ camphoræ fʒvij.
Sirupi zingiberis fʒss.
Tincturæ camph. comp. fʒi.
Fiat mistura, cujus sumantur cochlearia tria magna quartâ quâque horâ.
- R. Spirit. æther. sulph. comp. fʒij.
Spiritus ammon. succin. fʒj.
Misturæ camphoræ fʒvj.
Sirupi aurantii fʒss.
Misce: et fiat mistura: cujus sumantur cochl. duo magna urgente dolore.
- R. Misturæ camph. fortior. fʒvij.
Spirit. æther. sulph. comp.
Sirupi aurantii aa ʒss.
Fiat mistura, cujus sumantur cochlearia duo magna in horas.
- R. Spirit. ammon. succin. fʒij.
Misturæ camphoræ fʒvss.
Sirupi rhœados fʒss.
Misce: sumantur cochl. duo magna omni horâ.
- R. Camph. pulveris ʒj.
Sacchari, vel mellis ʒj.
Misturæ moschi ʒii.
Aque ferventis ʒivss.
Spiritus ætheris sulphurici ʒss.
Fiat mistura cujus sumantur cochleare amplum secundâ vel tertiâ quâque horâ.
- R. Lactis vaccin. Oi.
Sinap. sem. contus. ʒi.
M. coquantur simul donec coagulum formetur, et cola. Sumatur cyathum subinde.
- R. Radicis armoraciæ excisæ ʒij.
Seminis sinapis ʒjss.
- Baccæ juniperi contusæ ʒiij.
Vini albi Hispanici Oiij.
Digere per dies octo, dein cola: capiat æger cyathum parvum vinosum bis quotidie.
- R. Spirit. ammon. arom.
Spirit. lavand. comp. aa ʒi.
M. fiat mistura. Sumat. coch. j. min. ex aquâ, urgente flatu aut languore.
- R. Misturæ asafœtidæ fʒijij.
Misturæ camphoræ fʒiv.
Ammonie carbonatis ʒj.
Sirupi zingiberis fʒss.
Misce: capiat æger coch. tria ampla omni horâ.
- R. Misturæ moschi.
Mist. camph. fortior. aa fʒiiss.
Spirit. ætheris nitrici fʒij.
Sirupi rhœados fʒss.
Fiat mistura, cujus sumantur cochlearia duo magna tertiâ quâque horâ.
- R. Misturæ moschi fʒvij.
Spirit. ætheris sulph. c.
Sirupi rosæ aa ʒss.
Fiat zulapium, de quo capiat æger cochleare magnum subinde.
- R. Olei terebinth. rectific. fʒijij.
Ovi vitell. un.
Sacch. pur. ʒss.
Aque destillatæ fʒvij.
Misce ut fiat mistura, cujus sumat æger cochlearia tria magna ter in die.
- R. Acidi hydrochlorici ʒi.
Aque ʒj.
Sacchari q. s.
Misce. Sit pro potu communi.
- R. Decocti senegæ ʒviss.
Mist. acaciæ ʒss.
Sirupi tolut. ʒi.
M. fiat mistura; sumat cochl. tria ampla tertiis horis. (In bronchitis with excessive secretion and great debility; in bronchitis senilis.)

R. Misturæ camphoræ f̄vj.
Acidi sulph. dil. f̄jss.
Sirupi simp. ʒvss.
Fiat mistura, cujus capiat æger cochlearia tria subinde.

R. Terebinth Venet. ʒi.

Vitel ovi q. s.

Spt. junip. c. ʒi.

Aq. font. ʒvi.

M. fiat mistura: sumantur coch. duo magna tertiâ quâque horâ. (In the chron. form of muscular rheumatism.)

R. Infus. rosæ f̄vj.

Vini rubri f̄ʒij.

Misce pro potu ordinario.

R. Camphoræ gr. xxv.

Spirit. rectificati ℥v.

Fiat terendo pulvis; dein adde

Pulveris acaciæ ʒiv.

Sirupi limonis f̄ʒss.

Aquæ menthæ viridis f̄ʒvij.

Ut fiat emulsio: sit dosis cochlearia tria magna.

In the form of Pill or Powder.

R. Creasoti ℥x.

Pulv. glycyrrhizæ ʒl.

Mucil. acac. q. s.

M. ut fiat massa in pil. xx. dividenda.

Sumat duas ter die. (The number of pills may be gradually increased. Give

on neuralgia, atonic rheumatism, and chronic bronchitis.)

R. Camphoræ, Moschi, aa ʒss.

Fiat pulvis ex quovis vehiculo idoneo sumendus.

2. INTERNAL STIMULANTS, ACTING LOCALLY UPON CERTAIN SYSTEMS OR PARTS.

ON THE MUSCULAR SYSTEM.

R. Strych. nuc. vom. gr. iij.

Pulv. acaciæ ʒl.

Aquæ cinnam. ʒiss.

Tinct. cardam. c. ʒi.

M. f. haustus, ter die sumendus.

R. Strychniæ gr. i.

Sacch. alb. ʒiij.

Aquæ destill. ʒiij.

Aceti ℥ii.

M. fiat mistura cujus sit dosis cochlear. parv. nocte manequæ. (The dose to be increased gradually.)

R. Strych. nuc. vom. ʒi.

Confect. rosæ gall. ʒiij.

M. fiat massa in pil. lx. dividenda.

Sumat æger unam nocte manequæ.

R. Strychniæ gr. ii.

Spirit. rect. ʒi.

Solve fiat tinctura cujus sit dosis ℥x.

(The foregoing are used with advantage in partial or general paralysis in the absence of inflammation or fever.

The dose of the tincture may be cautiously increased to ℥xxx.)

ON THE UTERUS.

R. Ergotæ ʒi.

Aquæ ʒiij.

M. decoque celeriter ad ʒiss. (A teaspoonful every twenty minutes for three or four doses in succession.)

R. Secal. cornuti ʒss.

Aq. bull. ʒxxiv.

Adde infus.

Sirup. simp. ʒi.

M. sumantur uncias duas tertiis horis.

(The first form may be used in lingering labors dependent on deficient action of the uterus; the second with a view of inducing premature labor in cases of deformed pelvis, &c. The ergot has also been used in the dose of ten grains every two hours, in hæmorrhage from the uterus, bladder, and lungs; and in five-grain doses three times a day in leucorrhœa.)

ON THE MUSCULAR COAT OF THE BLADDER.

R. Tinct. cantharidis ʒi.

Tinct. hyoscyami ʒiij.

Misce. Sit dosis ℥x. ter die ex aqua sumenda. (In incontinence of urine from debility of the bladder, and in obstinate gleet. To be gradually increased to 15 drops or more.)

R. Canthar pulv. gr. ii.

Camphoræ gr. iv.

Ext. hyoscyami gr. vi.

Spirit. vini rect. ℥iij.

Contere bene ut fiat massa in pil. iv. dividenda. Sumat æger unam bis in die, bibens subinde decoct. hordei. (The same as the foregoing. The preceding form is to be preferred.)

ON THE MUCOUS MEMBRANES.

- R. Copalibæ bals. $\mathfrak{z}\text{iii}$.
 Liq. potassæ carb. $\mathfrak{z}\text{iss}$.
 Decoct. hordei $\mathfrak{z}\text{viiss}$.
 Copalibam cum liq. pot. carb. primum
 conterere, dein adde gradatim decoct.
 hordei. Sit dosis $\mathfrak{z}\text{i}$ – $\mathfrak{z}\text{iss}$. ter die.
- R. Copalibæ bals.
 Magnes. $\mathfrak{aa}$ $\mathfrak{z}\text{i}$.
M. divide in pil. cc. quarum suman-
tur vi–xii. ter die.
- R. Bals. Peruv. $\mathfrak{z}\text{ii}$.
 Vitel. ovor. ii.
Tere simul et adde
 Ext. cinch. $\mathfrak{z}\text{ss}$.
 Mell. ros. $\mathfrak{z}\text{vi}$.
M. cochl. i. magn. ter die. (Chronic
 bronchitis.)
- R. Piper. cubebæ $\mathfrak{z}\text{i}$.
 Sacch. alb. $\mathfrak{z}\text{ii}$.
 Mucil. acac. $\mathfrak{z}\text{ii}$.
 Aq. cinnam. $\mathfrak{z}\text{vi}$.
M. f. emulsio, cujus sumat cochl. ii.
magna ter in die. (Gonorrhœa, gleet,
 &c.)
- R. Piper. cubebæ $\mathfrak{z}\text{ss}$.
 Mellis opt.
 Confect. sennæ $\mathfrak{aa}$ $\mathfrak{z}\text{ii}$.
M. fiat electuarium incipiente gonor-
rheæ sumendum, et si nausea absit,
post horas duas repetendum. (Large
- doses of cubebæ, if the stomach will
 bear them, sometimes cut short an at-
 tack of gonorrhœa.)
- R. Olei terebinth. $\mathfrak{z}\text{ii}$.
 Mellis $\mathfrak{z}\text{iv}$.
 Pulv. glycirrh. q. s.
 Misce: fiat electuarium, cujus suman-
 tur cochleare i. magnum ter die. (In
 bronchitis.)
- R. Olei terebinth. $\mathfrak{z}\text{i}$.
 Aquæ tepidæ $\mathfrak{z}\text{xii}$.
 Inhalatur vapor. (In chronic catarrh,
 with profuse expectoration.)
- R. Tinct. Iodinii $\mathfrak{Mx}$ – $\mathfrak{xx}$.
 Aquæ tepidæ $\mathfrak{z}\text{vi}$.
M. et statim inhalatur vapor. (In
 phthisis: must be used with caution.)
- R. Aquæ chlorinii. (saturatæ) $\mathfrak{Mv}$ – $\mathfrak{x}$.
 Aquæ tepidæ $\mathfrak{z}\text{iv}$.
M. et statim inhalatur vapor. (Gan-
 grene of the lung, phthisis. The in-
 halation may be continued for about
 five minutes, and be repeated fre-
 quently in the course of the day.)
- R. Liq. ammoniæ $\mathfrak{z}\text{i}$.
 Aquæ tepidæ $\mathfrak{z}\text{iv}$.
 Inhalatur vapor. (As a stimulant
 in chronic laryngitis. If it excites
 coughing, the quantity of ammonia
 must be lessened.)

3. EXTERNAL AND LOCAL STIMULANTS.

RUBEFACIENTS (Stimulating Embrocations, Plasters, Ointments, &c.)

- R. Pulv. sem. sinapis $\mathfrak{z}\text{j}$.
 Acidi acetici $\mathfrak{f}\mathfrak{z}\text{ss}$.
 Linimenti saponis c. $\mathfrak{f}\mathfrak{z}\text{jss}$.
Fiat embrocatio.
- R. Tinct. canth.
 Lin. sap. c. $\mathfrak{aa}$ $\mathfrak{f}\mathfrak{z}\text{j}$.
Fiat linimentum.
- R. Tinct. cantharidis $\mathfrak{f}\mathfrak{z}\text{j}$.
 Olei terebinth. rect. $\mathfrak{f}\mathfrak{z}\text{ss}$.
 Linimenti camphoræ $\mathfrak{f}\mathfrak{z}\text{ss}$.
Fiat embrocatio.
- R. Olei cajuputi $\mathfrak{f}\mathfrak{z}\text{jss}$.
 Liq. ammon. carbonatis $\mathfrak{f}\mathfrak{z}\text{ss}$.
Fiat embrocatio.
- R. Camphoræ $\mathfrak{z}\text{jss}$.
 Olei terebinth. rect. $\mathfrak{f}\mathfrak{z}\text{jss}$.
Solve pro embrocatione.
- R. Liq. ammon. carbonatis $\mathfrak{f}\mathfrak{z}\text{ss}$.
 Linimenti saponis comp. $\mathfrak{z}\text{jss}$.
Fiat linimentum.
- R. Liq. potass. subcarbonatis $\mathfrak{f}\mathfrak{z}\text{ss}$.
 Linimenti saponis comp. $\mathfrak{z}\text{jss}$.
 Misce pro embrocatione.
- R. Antim. pot. tart. $\mathfrak{z}\text{i}$.
 Hydrarg. bisulphureti gr. x.
 Unguent. cetacei $\mathfrak{z}\text{vii}$.
M. fiat unguentum.
- R. Antim. pot. tart. $\mathfrak{z}\text{ii}$.
 Tinct. cantharidis $\mathfrak{f}\mathfrak{z}\text{i}$.
 Aquæ rosæ $\mathfrak{z}\text{ii}$.
 Solve ant. pot. tart. in aqua rosæ calidâ
 dein adde tincturam.
- R. Potass. sulphuret.
 Saponis albi. $\mathfrak{aa}$ $\mathfrak{z}\text{ii}$.
 Alcohol. rect. $\mathfrak{z}\text{i}$.
M. fiat lotio. (In porrigo favosa and
 scabies.)
- R. Potass. carb. $\mathfrak{z}\text{i}$.
 Sulphur. precip. $\mathfrak{z}\text{ii}$.
 Adipis $\mathfrak{z}\text{iv}$.
M. fiat unguentum. (Applied every
 night in scabies, with great success.)

R. Picis liquidæ ℥iv.
Cereæ flavæ ℥ss.
Solve leni calore, et adde terendo.
Sulphuris ℥i.
M. f. unguentum. (In porrigo, impetigo, &c.)

R. Linimenti hydrargyri ℥ss.
Olei terebinth. rectificati f℥ss.
Linimenti camphoræ f℥j.
Fiat embrocatio, cujus illinatur cochleare medium in partes affectas bis quotidie.

R. Olei succini rectificati f℥ij.
Linimenti saponis comp. f℥x.
Fiat embrocatio, cujus illinatur cochleare minimum ter in die in dorsum. (Analogous to Roche's royal embrocation.)

R. Camphoræ ℥ij.
Olei olivæ f℥j.
Olei terebinth. rectificati f℥ss.
Fiat embrocatio.

R. Camphoræ ℥ss.
Olei olivæ optimi f℥ij.
Fiat embrocatio.

R. Sinap. pulv.
Lini pulv. ʒā ℥viii.
Aceti cudi quantum sufficit, ut fiat cataplasma plantis pedum applicandum, per tres vel. quatuor horas, dein auferendum.

R. Olei macis f℥ss.
Cerati saponis ℥ij.
Fiat emplastrum toto abdomini imponendum.

R. Ol. croton tigllii ℥x.
Adipis ℥ss.
M. fiat unguentum. Infricetur ad nucis magnitudinem bis terve in die, donec appareat eruptio cutanea. (As a counter-irritant in internal inflammations.)

R. Creasoti ℥v.-xxx.
Adipis ℥ss.
Fiat unguentum. (In acne, sycosis, lepra, psoriasis, ozoena, and ill-conditioned ulcers.)

R. Creasoti ℥iv.
Aquæ ℥i.
M. fiat embrocatio. (In rheumatism.)

R. Argent. nit. gr. x.
Ung. cetacei ℥i.
Liq. plumbi. acet. ℥x.
Misce: fiat unguentum. (The size of

a pin's head to be introduced between the eyelids in purulent ophthalmia.—Guthrie.)

R. Hyd. chlorid. gr. cc.
Arsenici. oxid. alb. gr. i.
M. f. pulvis. (In lupus, to be sprinkled over a small portion of diseased surface by means of a puff.—Dupuytren.)

R. Sinapis pulv. ℥iv.
Aquæ tepidæ q. s.
Fiat pediluvium.

R. Acidi nitro muriat. ℥ii.-℥iv.
Aquæ tepidæ (96°) Cong. iv. vel. q. s.
Ut fiat pediluvium. (Hepatic derangement with dyspepsia and constipation. It may be used in the proportion of ℥i. to 8 gallons, as a bath for the whole body, or the surface may be spunged with it.)

R. Acidi hydrochlor. ℥ii.-℥iv.
Aquæ tepidæ (96°) cong. iv. vel. q. s.
Ut fiat pediluvium.

R. Potass. carb. ℥iv.
Aquæ tepid. lb. ccc.
M. fiat balneum alkalinum. (This may be sprinkled on bran, and applied to the skin in cutaneous diseases with low action of the skin.)

R. Manganesi binoxidi ℥i.
Sodii chloridi ℥iii.
Tere optime et adde
Acidi. sulph. ℥i.
Aquæ ℥ii.
(The chlorine given off from this mixture on the application of heat forms a powerful stimulant in certain cases of cutaneous disease, and in chronic rheumatism, &c. The vapor must be so applied to the surface that it may not reach the lungs. The vapors of sulphur applied with the same precaution are of great service in obstinate forms of skin disease.)

R. Liq. ammon. fort. ℥i.
Spir. rosmarinæ ℥vi.
Spir. camphoræ ℥ii.
M. (a highly stimulant application, to be used where a rapid action on the skin is required. The acidum aceticum, or the acetum cantharidis of the London Pharmacopœia, may be used with the same object.)

516 NARCOTICS, ANODYNES, AND SEDATIVES.

STIMULATING GARGLES.

R. Capsici contusi. gr. v. Aque bull. ℥viij. Mellis rosæ. Tinct. myrrhæ āā ʒiv. Sit gargarisma sæpe usurpandum.	R. Infusi rosæ ʒiij. Tinct. myrrhæ ʒiij. Sacchari pur. ʒv. Fiat gargarisma in usum.
R. Vini rubri Lusitan. ʒvj. Extracti cinchonæ ʒj. Misce in usum.	R. Acidi muriatici fʒss. Aque hordei fʒviij. Mellis rosæ ʒj. Fiat gargarisma.
R. Potassæ nitratis ʒij. Aque hordei fʒviij. Oxymellis fʒviij. Fiat gargarisma sæpe utendum.	R. Aque hordei fʒviij. Acidi hydrochl. Acidi nit. āā ℥x. Mellis rosæ fʒj. Fiat gargarisma.
R. Sol. chlor. calcis ʒj.-ij. Mucilag. acaciæ ʒj. Aque fontis ʒvss. Sirupi simplicis ʒiv. M.	R. Boracis ʒij. Aque ʒviij. Mellis rosæ ʒi. Misce ut fiat gargarisma.
R. Tinct. capsici ʒss.-ʒl. Sirupi simp. ʒi. Aque rosæ ʒvii.	R. Muc. acaciæ ʒviii. Olei terebinth. ʒiij. M. fiat gargarisma. (In pytaliam.)
M. f. gargarisma sæpius in die utendum. (Chronic tonsillitis.)	

STIMULATING ENEMATA.

R. Decocti hordei ʒx. Sol. calcis chlorureti ʒiv. Fiat enema mane vespereque injiciendum.	R. Infusi fœniculi fʒxij. Tinct. asafœtidæ fʒss. Fiat enema.
R. Aque hordei ʒx. Olei menthæ piperitæ ℥iv. Olei terebinth. ʒj. Tinct. asafœtidæ ʒiij. Fiat enema tertiis vel quartis horis injiciendum. (In typhoid states, the abdomen being much distended with gas.)	R. Aceti communis fʒiij. Infusi anthemidis fʒv. Misce pro enema.
	R. Seminis fœniculi contusi ʒiij. Aque ferventis fʒxxvj. Macera per horam, dein cola pro enema.

NARCOTICS, ANODYNES, AND SEDATIVES.

(Including Antispasmodics belonging to these Classes.)

R. Opii gr. i. Fiat pilula horâ somni sumenda.	Aq. menthæ virid. ʒi. Tinct. opii ℥xxv. Sirupi tolut. ʒss. M. fiat haustus h. s. s.
R. Extracti opii gr. ʒ. Extracti papaveris gr. viij. Fiant pilulæ duæ ter in die sumendæ.	R. Tinct. opii ℥xxx. Liq. ammon. acet. ʒss. Aq. cinnam. Sirupi zingib. āā ʒii. M. fiat haustus horâ somni sumendus, vel urgente dolore.
R. Vinct. opii ℥xx. Aque cinnam. Aque puræ āā ʒvi. M. fiat haustus horâ somni sumendus.	R. Pulv. ipecac. comp. gr. i. Sacchari ʒi. M. et divide in chartulas iv. (For young infants.)
R. Morphiæ acetatis gr. i. Aque destill. ʒi. Solve: sumat cochl. i. minimum horâ somni vel urgente dolore.	R. Acidi hydrocyanici dil. ℥ii. Mist. amygdal. ʒi.
R. Potassæ subcarb. ʒi. Succi limonis ʒss.	

M. f. haustus. (The dose may be gradually increased to five or six drops. In irritable stomach, gastralgia, palpitations, angina pectoris, spasmodic affections of the muscles of respiration, &c.)

R. Acidi hydrocyanici dil. ℥ii.

Tinct. digitalis ℥v.

Mist. camphoræ ʒi.

M. fiat haustus, quartis horis sumendus.

R. Mist. cretæ ʒvi.

Conf. arom. ʒii.

Tinct. opii ℥xxx.

Aquæ cinnam. ʒii.

M. fiat mistura cujus sumantur cochli. ii. magna post singulas sedes liquidas. (In chronic diarrhœa.)

R. Tinct. opii ℥i.

Muc. acac.

Sirup. simp. aa ʒss.

Aquæ destill. ʒi.

M. fiat mistura narcotica. (To procure sleep in very young children: dose, a tea-spoonful for a child of one month, repeated every half hour till sleep is procured.)

R. Liq. opii sedativ. ℥xii.

Vin. antim. ʒi.

Liq. ammon. acet.

Sirupi tolutani aa ʒvi.

Aquæ ʒiss.

Sit dosis cochli. i. medium subinde urgente tussi.

R. Ext. lactucæ sativæ gr. iv.

Camphoræ gr. ii.

Spirit. vin. rect. ℥ii.

M. fiat pil. ii. h: s. s.

R. Tinct. digitalis ℥x.-xxx.

Potassæ nitratis gr. vj.

Aq. menthæ viridis ʒxiiij.

Sirupi croci ʒj.

Misce, pro haustu sextâ quâque horâ sumendo.

R. Tinct. digitalis ℥x.-xxx.

Acidi sulphurici dil. ℥xv.

Aquæ menthæ viridis ʒxi.

Sirupi rhœados ʒj.

Fiat haustus sextis horis sumendus.

R. Tinct. digitalis ℥vj.-xx.

Liq. ammon. acet. ʒiiij.

Sirupi rosæ ʒj.

Aquæ menthæ viridis ʒx.

Fiat haustus quartis horis adhibendus.

R. Potassæ nitratis gr. vj.

Tinct. digitalis ℥v.-x.

Liq. ammon. acetatis ʒij.

Aquæ destillatæ ʒv.

Sirupi croci ʒj.

Fiat haustus tertiâ quâque horâ adhibendus.

R. Extracti conii gr. j.-iv.

Fiat pilula quavis nocte sumenda.

R. Extracti conii gr. v.

Hydrargyri submuriatis gr. ʒ.

Fiat pilula quartâ quâque horâ sumenda.

R. Extract. conii.

Pulv. ipecac. comp. aa ʒi.

Mucil. acac. q. s.

Ut fiat massa in pilulas x. dividenda. Sumat unam tertiis horis.

R. Extracti conii ʒss.

Pulv. fol. conii gr. xv.

M. divide in pil. xii. quarum sumat unam ter die. (In cancer and other painful affections where opium disagrees.)

R. Extracti hyoscyami gr. v.

Fiat pilula quartâ quâque horâ sumenda.

R. Aquæ cinnamomi ʒj.

Tinct. hyoscyami ℥xxx.

Sirupi simplicis ʒiv.

Fiat haustus.

R. Camph. pulveris gr. iij.

Extracti hyoscyami gr. ij.

Fiat pilula tertiâ, quartâ, vel sextâ quâque horâ sumenda.

R. Extracti hyoscyami gr. ij.-v.

Extracti conii gr. iij.

F. pilula sextis horis sumenda.

R. Extracti hyoscyami gr. ij.-x.

Pulveris digitalis gr. ʒ.

Fiat pilulas sextâ quâque horâ sumenda.

R. Extract. aconiti gr. i.

Extract. glycirrh. gr. viii.

M. fiat massa in pilulas iv. dividenda, sumat unam, bis vel ter die.

R. Pulv. digitalis.

Pulv. scillæ.

Ext. hyoscyami aa ʒi.

Misce et divide in pilulas xii. quarum sumatur una ter die. (Bronchitis, asthma, &c.)

R. Mist. camphoræ $\mathfrak{z}$ i.
Tinct. digitalis $\mathfrak{M}$ v.-x.
Acidi hydrocyanici dil. $\mathfrak{M}$ ii.
M. fiat haustus.

R. Ext. belladonnæ gr. ii.
Aqueæ destill. $\mathfrak{z}$ i.

Fiat mistura, sit dosis $\mathfrak{M}$ v.-x. (As a prophylactic in scarlatina.)

R. Ext. stramonii gr. i.
Ext. glycyrrh. $\mathfrak{z}$ i.

M. ut fiat massa in trochismata vi. distribuenda. Sumat unum p. r. n. (In cough, with irritation of the larynx or throat.)

R. Ext. belladonnæ gr. iv.
Extracti conii.
Pulv. ipecac. t. $\mathfrak{a}\mathfrak{a}$ $\mathfrak{z}$ i.

M. et divide in pil. xvi. sumat. i. sextis vel quartis horis. (Given in pertussis and scarlatina.)

R. Acidi sulph. dil.
Tinct. hyoscyami $\mathfrak{a}\mathfrak{a}$ $\mathfrak{M}$ xx.
Tinct. digitalis $\mathfrak{M}$ x.
Liq. ammon. acet. $\mathfrak{z}$ ss.
Aqueæ $\mathfrak{z}$ i.

M. f. haustus ter die sumendus. (Very useful in hyperlactatio and states of system called "nervous.")

R. Vini ipecacuanhæ f $\mathfrak{z}$ ss.
Oxymellis scillæ f $\mathfrak{z}$ ss.

Misce: sumat æger cochl. unum minimum subinde.

R. Tinct. scillæ f $\mathfrak{z}$ jss.
Oxymellis ejusdem.
Aqueæ destill. aa f $\mathfrak{z}$ jss.

Misce: sumat cochleare minimum omni horâ.

R. Mist. amygdalæ f $\mathfrak{z}$ v.
Potassæ nitratis gr. xv.

Sirupi papaveris f $\mathfrak{z}$ ss.
Misce: sumat æger cochleare medium urgente tussi.

EXTERNAL APPLICATIONS.

R. Camphoræ gr. x.
Aceti communis f $\mathfrak{z}$ ij.
Aqueæ destillatæ f $\mathfrak{z}$ xiv.
Fiat lotio frigida capiti raso applicanda.

R. Liq. ammon. acet.
Acidi acet.
Spir. tenuioris, $\mathfrak{a}\mathfrak{a}$ f $\mathfrak{z}$ j.
Aqueæ puræ f $\mathfrak{z}$ j.

Misce: fiat lotio.

R. Mist. camp. f $\mathfrak{z}$ vj.
Liq. ammon. acet. f $\mathfrak{z}$ ij.

Misce: fiat lotio.

R. Liq. ammon. acet.
Spir. tenuioris.
Aq. singulor., partes equales.

Misce: fiat lotio, capiti raso, applicanda.

R. Liq. potassæ $\mathfrak{z}$ ii.
Acidi hydrocyanici dil. $\mathfrak{z}$ i.
Mist. amygdal. $\mathfrak{z}$ viii.

M. f. lotio. (In prurigo.)

R. Plumbi acetatis $\mathfrak{z}$ ss.
Acidi hydrocyanici dil. $\mathfrak{z}$ iii.
Unguent. cetacei $\mathfrak{z}$ iii.

M. f. unguentum. (In cases of eczema, &c.)

R. Potassii cyanidi gr. xii.
Ol. amygdal. $\mathfrak{z}$ ii.
Ung. ceræ alb. $\mathfrak{z}$ ii.

M. fiat unguentum. (In lichen and prurigo.)

R. Veratriæ gr. iv.
Alcohol $\mathfrak{M}$ vi.

Adipis $\mathfrak{z}$ ss.

M. bene: fiat unguentum. (In neuralgia.)

R. Aconitinæ gr. ii.-iv.
Alcohol $\mathfrak{M}$ ij.
Adipis $\mathfrak{z}$ ss.

M. optime: f. unguentum.

R. Ext. belladonnæ $\mathfrak{z}$ ii.
Cerat. cetacei $\mathfrak{z}$ i.

M. f. unguentum.

R. Opii $\mathfrak{z}$ ii.
Aqueæ ferventis lb. j.
Solve, pro fomentatione.

R. Conii fol. exsicc. $\mathfrak{z}$ i.
Aqueæ lb. iiss.

Decoque ad lb. ii. Cola. Sit pro fomentatione. (Scrofulous ulcers, cancers, &c.)

R. Ext. belladonnæ $\mathfrak{z}$ ii.
Aqueæ culecis $\mathfrak{z}$ viii.
Ol. amygdal. $\mathfrak{z}$ iv.

M. fiat linimentum. (To be applied with a feather in acute eczema and impetigo.)

R. Ext. belladonnæ $\mathfrak{z}$ i.
Emp. saponis $\mathfrak{z}$ ii.

M. f. emplastrum regioni cordis, vel parti dolenti applicandum. (Angina pectoris, palpitation, pleurodynia, &c.)

R. Conii fol. exsicc. $\mathfrak{z}$ ii.
Med. panis $\mathfrak{z}$ vi.
Aqueæ ferventis q. s.

Ut f. cataplasma. (Cancer, &c.)

ENEMATA, ETC.

R. Camphoræ ʒj. Olei olivæ fʒij.	sleep, or to allay irritation in the rectum, bladder, or uterus.
Solve pro enemate urgente pruriginē adhibendo. (In the irritation of worms.)	R. Tinct. opii ℥xl. Mucil. amygd. ʒiv.
R. Fol. belladonnæ gr. xii. Aq. fervent. ʒvi.	M. fiat enema. (The same as the foregoing.)
Macera, fiat injecto. (In spasmodic contraction of the urethra.)	R. Camph. ʒi. Spirit. rectific. q. s. Vitel. ovi. i.
R. Opii gr. ii. Saponis duri. gr. iii.	Decoct. hordei ʒxiv.
M. fiat suppositorium. (To procure	M. f. enema. (In low typhus.)

STIMULANTS, IN COMBINATION WITH NARCOTICS, SEDATIVES, AND ANODYNES.

(Including Stimulant and Anodyne Antispasmodics.)

R. Ammon. sesqui-carbon. gr. xij. Succi limonis recentis q. s. Mist. camph. fʒx. Sirup. aurantii fʒj. Tinct. opii ℥x.-xxx.	R. Camphoræ. Moschi. Asafoetidæ, sing. gr. iii. Opii gr. i. Sirupi zingib. q. s.
Fiat haustus quartâ vel sextâ quâque horâ sumendus.	Fiat bolus omni bihorio adhibendus.
R. Mist. camphoræ fʒxiv. Tinct. opii fʒss. Sirupi tolutani fʒj.	R. Camphoræ gr. viij. Moschi gr. vj. Pulveris opii gr. ij.
M. fiat haustus.	F. pulvis ex sirupo sumendus.
R. Mist. camph. fortior. fʒvij. Spirit. æther. sulph. comp. Sirupi rhœados aa fʒss. Tinct. opii fʒj.	R. Pil. saponis cum opio gr. iij. Pulveris capsici gr. iij. Olei fœniculi ℥ij.
Misce. Sit dosis cochlearia tria magna.	Fiat pilulæ duæ sextâ quâque horâ sumendæ.
R. Mist. camphoræ cum duplici camphoræ quantitate ʒviij. Spirit. æther. sulph. ʒij. Tinct. opii ʒss. Pulv. moschi ʒss. Spirit. ammon. aromatici ʒij.	R. Camphor. gr. iv. Ammon. sesquicarb. gr. iii. Ext. hyoscyami gr. iv. Mucil. q. s.
M. fiat mistura, cujus sumantur cochl. ii. vel iii. secundâ vel tertiâ quâque horâ, pro ut urgeant symptomata.	Ut fiat pil. iii. statim sumendæ.
R. Tinct. valerianæ ammon. ʒss. Spirit. æther. sulph. ʒi. Tinct. hyoscyami ʒss. Mist. camphoræ ʒi.	R. Moschi gr. x. Æther. sulph. Tinct. opii aa ℥xx. Aq. cinnam. ʒi.
M. fiat haustus. (In hysteria.)	M. f. haustus ter die sumendus. (Last stage of typhus.)
R. Spirit. æther. sulph. ʒiss. Tinct. opii ℥xx. Tinct. valerianæ ammon. ʒij. Spirit. cinnamomi ʒi. Aquæ anethi. ʒiii.	R. Mist. camphoræ ʒvi. Liq. ammon. acet. ʒiii. Spirit. æther. sulph. c. Tinct. camphor. c. Sirupi papav. aa ʒi.
M. fiat mistura cujus sumat cochl. ii. magna bis terve in die. (Gastralgia, flatulence, &c.)	M. f. haustus.
	R. Liq. opii sedativ. ℥x. Mist. camph. ʒi. F. fiat haustus.
	R. Castorei ʒi. Ammon. carb. gr. v. Sirup. q. s.
	Ut fiat bolus. (Hysteria.)

EXTERNAL APPLICATIONS, ETC.

R. Lin. saponis comp. f $\overline{3}$ ss.

Tinct. opii f $\overline{3}$ ss.

Fiat embrocatio, cujus illinatur quarta pars ter in die in partes affectas.

R. Olei cajuputi f $\overline{3}$ ss.

Tinct. opii f $\overline{3}$ ss.

Fiat linimentum eodem modo utendum.

R. Tinct. cantharidis f $\overline{3}$ ss.

Linimenti camphoræ f $\overline{3}$ j.

Tinct. opii f $\overline{3}$ ij.

Liq. ammon. carbon. f $\overline{3}$ j.

Fiat embrocatio partibus affectis applicanda.

R. Extract. conii $\overline{3}$ ij.

Olei anisi f $\overline{3}$ ss.

Fiat emplastrum.

R. Olei camphorati $\overline{3}$ ij.

Morphiæ acetatis gr. ij.

Fiat unguentum in usum.

R. Galla pulveris $\overline{3}$ j.

Camphoræ $\overline{3}$ ss.

Tinct. opii f $\overline{3}$ ij.

Cerati $\overline{3}$ j.

Tere simul ut fiant unguentum quo partes affectæ nocte maneque illinatur.

R. Lin. camph. comp. $\overline{3}$ iv.

Tinct. opii $\overline{3}$ iv.

Potassæ hydriodatis $\overline{3}$ ij.- $\overline{4}$ j.

Misce fiat linimentum.

R. Tinct. asafœtidæ $\overline{3}$ ss.

Tinct. opii $\overline{3}$ j.

Aquæ destillate $\overline{3}$ viii.

Fiat enema.

R. Olei terebinth. $\overline{3}$ l.

Camphoræ $\overline{3}$ i.

Ol. olivæ $\overline{3}$ ias.

Vitell. ovi l.

Spirit. ammon. foet. $\overline{3}$ ii.

M. fiat enema. (In flatulent colic, tympanites, &c.)

TONICS.

R. Tinct. cinchonæ comp. f $\overline{3}$ j.

Tinct. valer. ammon. $\overline{4}$ xxx.

Infus. quassiae f $\overline{3}$ xij.

F. haustus ter in die sumendus.

R. Confectionis rosæ $\overline{3}$ j.

Aquæ ferventis $\overline{3}$ ss.

Acidi sulphurici diluti $\overline{4}$ ij.

Quinæ disulphatis gr. ij.

Tinct. aurantii $\overline{3}$ j.

Fiat haustus, secundâ vel tertiâ quâque horâ intermissionis tempore, adhibendus.

R. Acidi nitrici diluti $\overline{4}$ viii.

Aquæ destill. f $\overline{3}$ xij.

Sirupi simplicis f $\overline{3}$ ij.

Fiat haustus ter quaterve die sumendus.

R. Acidi nitrici f $\overline{3}$ j.

Aquæ destill. f $\overline{4}$ ij.

Sirupi aurantii f $\overline{3}$ ss.

Fiat mistura quotidie sumenda, ope tubuli vitrei, partitis haustibus.

R. Rad. armoracæ contusæ $\overline{3}$ ij.

Seminis sinapis.

Radiceis valerianæ $\overline{4}$ â $\overline{3}$ ij.

Radiceis rhei incisæ $\overline{3}$ ss.

Infunde in vini Hispanici Oij: sæpe agitetur, et coletur usûs tempore: cochl. duo magna quartâ quâque horâ sumenda.

R. Acidi muriat. oxygen. f $\overline{3}$ j.

Aquæ menthæ viridis f $\overline{3}$ xiv.

Sirupi aurantii f $\overline{3}$ j.

Fiat haustus ter quaterve die sumendus.

R. Aq. menthæ piperitæ $\overline{3}$ j.

Sirupi aurantii $\overline{3}$ iv.

Acidi muriatici.

Acidi nitrici $\overline{4}$ â $\overline{4}$ ij.

Fiat haustus.

R. Decocti cinchonæ $\overline{3}$ xl.

Acidi sulphur. diluti $\overline{4}$ xij.

Sirupi glycyrrhizæ $\overline{3}$ j.

Fiat haustus.

R. Aquæ destill. $\overline{3}$ x.

Acidi nitrici diluti $\overline{3}$ ij.

Sirupi aurantii $\overline{3}$ ij.

Misce pro potu ordinario.

R. Magnesiae $\overline{3}$ j.

Liquoris calcis $\overline{3}$ vii.

Tinct. cardamomi $\overline{3}$ ss.

Fiat mistura, cujus sumat æger cochlearia tria magna in dolore.

R. Confectionis aromat. $\overline{3}$ j.

Spirit. æther. sulph. c. f $\overline{3}$ ss.

Mist. camphoræ $\overline{3}$ vij.

Sirupi zingiberis f $\overline{3}$ ss.

Misce: sumantur cochlearia tria parva in dolore.

R. Quassiae rasuræ ʒj.
Corticis aurantii concisæ ʒjss.
Aque ferventis Oj.

Stent in vase aperto per horæ spatium,
et cola. Infusionis colatæ capiat æger
cochlearia quatuor bis quotidie.

R. Tinct. ferri muriatis ʒss.
Cujus adhibeantur guttæ sex ter qua-
terve die ex poculo alicujus liquoris
idonei, infuso theæ excepto.

R. Aquæ cinnamomi.
Aq. menthæ viridis aa fʒvj.
Sirupi aurantii fʒj.

Misce, dein adde—acidi muriatici,
acidi nitrici, aa ʒjss.: fiat haustus
quater in die sumendus.

R. Zinci sulphatis gr. iv.
Infus. quassiae fʒvij.
Tinct. calumbæ fʒj.

Fiat mistura, cujus capiat æger cochl.
quatuor secundâ tertiâ vel quartâ quâ-
que horâ.

R. Zinci sulphatis gr. ij.
Decocti cinchonæ fʒvjss.
Tinct. gentianæ fʒij.

Fiat mistura, cujus sumantur cochl.
tria magna tertiâ vel quartâ quâque
horâ.

R. Cort. querc. exter. cont. ʒjss.
Aque ferventis fʒxxx.

Macera per horas duas vel tres, leni
calore, dein cola.

R. Hujus colatæ fʒjss.
Pulveris gallæ gr. x.
Tinct. cardamomi compositæ.
Sirupi zingiberis aa fʒj.

Fiat haustus secundâ tertiâ vel quartâ
quâque horâ sumendus.

R. Decocti cinchonæ fʒvi.
Extract. ejusdem gr. v.
Tinct. cinchonæ comp. fʒj.
Sirupi aurantii fʒj.

Fiat haustus quartis horis, in apyrexia,
sumendus.

R. Liq. arsenicalis ʒiv.—viij.
Tinct. cinnamomi fʒj.
Sirupi rheoados fʒj.

Aq. pimentæ fʒxij.
Misce: fiat haustus ter in die sumen-
dus.

R. Infusi calumbæ ʒiss.
Acidi muriatici ʒvj.
Tinct. opii ʒiv.

Fiat haustus secundis vel tertiis horis
adhibendus.

R. Ext. hellebori nigri Oj.
Ext. gentianæ Oij.

Fiant pilulæ xij. quarum sumantur
duæ nocte maneque.

R. Pulveris myrrh. comp. Oss.
Balsami Peruviani q. s.

F. bolus ter in die sumendus.

R. Pulv. cinchonæ ʒss.
Pulv. valerianæ Oss.

F. pulvis ter in die sumendus.

R. Sodæ carbonatis gr. vj.
Pulv. cinchonæ Oj.

F. pulvis ter in die sumendus.

R. Sodæ carbon. excis. gr. viij.
Pulv. cinchonæ Oj.

F. pulvis ter in die adhibendus.

R. Zinci oxydi gr. vj.
Ext. gentianæ gr. iv.
Sirupi zingiberis q. s.

Fiant pilulæ duæ ter in die sumendæ
cum haustulo infusi anthemidis.

R. Zinci sulphatis gr. i.
Ext. anthemidis gr. x.

Fiant pilulæ duæ ter in die sumendæ.

R. Cupri ammon. gr. ij.
Confectionis rosæ gr. v.
F. pilula ter quotidie sumenda.

R. Cupri sulphatis gr. ij.
Confectionis rosæ ʒj.
Ext. opii gr. iv.

Optimè misceantur in massam in pilu-
las xxiv. dividendam, quarum capiat
æger unam vel duas ter in die.

R. Argenti nitratis gr. j.
Confectionis rosæ gr. v.
Fiat pilula ter in die sumenda.

R. Argenti nitratis gr. ii.
Ext. humuli Oj.
Ext. hyoseyami gr. xii.

M. fiat massa in pilulas viii. div. sumat
unam ter die.

R. Liq. potassæ arsenitis ʒiv.
Decoct. cinchon. ʒx.
Sirupi aurantii ʒij.
Tinct. opii ʒiv.

M. fiat haustus bis in die sumendus.

R. Ext. taraxaci gr. x.
Sodæ carb. gr. iv.
Tinct. cardam. comp. ʒi.
Infus. calumbæ ʒi.
Aque pimentæ ʒiii.

M. fiat haustus ter quotidie sumendus.
(In chronic hepatic affections.)

R. Ext. gentianæ ʒij

Fellis bovini ʒiij.

Pulv. rhei ʒij.

Asafœtidæ ʒi.

M. et divide in pilulas cxx. Sumantur duas vel tres ter die.

R. Pilulæ ferri cum myrrhâ ʒss.

Fiant pilulæ duæ bis terve in die sumendæ.

R. Ext. tanacetii ʒss.

Ferri sulphatis ʒj.

Fiant pilulæ xxiv. quarum sumat duas ter in die.

R. Ext. tanacetii ʒj.

Ferri tartarizati ʒss.

Pilulæ galbani comp. ʒss.

Fiat massa in pilulas xxxvj. dividenda, è quibus sumat ægra tres ter quotidie.

R. Ferri sulph. exsicc.

Ext. gentianæ aa ʒss.

M. f. massa in pil. xii. divid.; quarum sumantur duæ ter die.

R. Ferri sulphatis gr. xij.

Ext. gentianæ ʒj.

Pulv. cinnam. comp. ʒss.

Fiat massa in pilulas xxiv. dividenda, quarum sumat ægra duas ter in die, superbibens haustum infusi alicujus amari.

R. Ferri sulph. ʒss.

Magnes. calcin. ʒii.

Tinct. quassia ʒij.

Aquæ ʒvi.

M. f. mistura cujus sumantur cochl. ii. magna ter die.

R. Ext. glycyrrhizæ concis. ʒij.

Aquæ puræ fʒxvj.

Coque et cola.

R. Myrrhæ ʒij.

Ferri sulphatis gr. xxiv.

Potassæ subcarbonatis ʒj.

Decoct. glycyrrh. fervent. ut supra præscripti fʒxiv.

Tinct. zingiberis fʒj.

Myrrham et ferri sulphatem cum potassæ subcarbonate tere donec perfecte commisceantur, dein gradatim adjice decoctum et denique tincturam.

ASTRINGENTS.

R. Aluminis purificati ʒss.

Infusi rosæ ʒxij.

Sirupi ejusdem ʒj.

F. haustus ter in die sumendus.

R. Aluminis gr. v.

Acidi sulph. dil. ℥xxx.

Infus. anthemidis fʒxij.

Sirupi aurantii fʒj.

Tinct. opii ℥vi.

F. haustus ter in die sumendus.

R. Aluminis purificati ʒss.

Kino gr. viij.

Confectionis opii ʒss.

F. bolus sextis horis sumendus.

R. Mist. cretæ fʒvj.

Sirupi papaveris fʒvj.

Fiat mistura, cujus capiat æger cochl. duo magna post singulas sedes liquidas.

R. Confectionis aromaticæ ʒj.

Mist. cretæ fʒxij.

Pulv. ipecac. gr. j.

Fiat haustus quartis horis sumendus.

R. Elec. catec. (Pharm. Ed.) ʒiij.

Decocti cuspariæ fʒvij.

Tinct. ejusdem fʒiij.

Fiat mistura.

R. Mist. cretæ fʒʒss.

Spirit. myristicæ fʒij.

Sirupi zingiberis fʒj.

Fiat haustus bis die sumendus.

R. Pulv. ipecac. comp. gr. v.

Mist. cretæ fʒx.

Spirit. cinnam. fʒij.

Sirupi papaveris fʒj.

F. haustus quartâ quâque horâ adhibendus.

R. Aluminis purificati ʒss.

Pulv. kino gr. v.

F. pulvis ter in die sumendus.

R. Pulveris rhei ʒss.

Confect. aromat. ʒj

Tinct. rhei fʒʒss.

Aq. menthæ piper. fʒʒss.

Sirupi croci fʒj.

Fiat haustus.

R. Zinci sulph. gr. iij.

Aluminis purificati gr. x.

Infus. rosæ fʒxij.

Sirupi ejusdem fʒj.

Fiat haustus sextis horis sumendus.

R. Tinct. ferri muriatis ℥x.

Aq. cinnamomi fʒij.

F. haustus ter in die sumendus.

R. Terebinth. de chio ʒi.
Kino pulv. ʒss.
Fiat pilulæ xxiv. quarum capiat æger
tres ter in die.

R. Potassæ nitratis ʒij.
Aceti communis fʒij.
Sirupi fʒij.
Aquæ destill. fʒxij.
Fiat potio quotidie bibenda.

R. Acidi sulph. diluti fʒjss.
Sirupi rosæ fʒij.
Aquæ destill. fʒiv.
Misce pro potu ordinario.

R. Acidi nitrici fʒj.
Sirupi rosæ fʒij.
Aquæ destill. fʒxiv
Misce pro potu communi.

R. Plumbi acet.
Opil aa gr. vi.
Sacchari albi. ʒij.
M. divide in chartulas xii. sumat unam
bis vel ter die. (Colliquative diarrhœa
and sweating of phthisis.)

R. Confect. aromat. ʒj.
Tinct. catechu fʒj.
Spirit. ammon. comp. fʒij.
Aquæ cinnamomi fʒvj.
Sirupi zingiberis fʒss.
Tinct. opil ʒxl.
Fiat mistura, de qua sumantur cochl.
tria magna post singulas sedes liquidas.

R. Cupri sulph.
Opil aa gr. ss.
Confect. rosæ q. s.
Ut fiat pilula ter die sumenda.

R. Acid. sulph. dil. ʒxxx.
Tinct. opil ʒxx.
Sirup. tolut. ʒi.
Aquæ ʒiss.
M. fiat haustus tertiis horis sumendus.
(Hæmorrhage.)

R. Acid. sulph. dil. ʒxxx.
Infus. rosæ comp. ʒi.
Sirupi simp. ʒi.
M. fiat haustus tertiis horis sumendus.

R. Confect. aromat. ʒj.
Tinct. catechu fʒj.
Mist. cretæ fʒvj.
Sirupi zingiberis fʒss.
Tinct. opil fʒss.
Fiat mistura, ejus sumantur coch-
learia duo vel tria post singulas sedes
liquidas, concusso prius phialo.

R. Confect. opil ʒjss.
Tinct. kino fʒj.
Sirupi zingiberis fʒss.
Mist. cretæ fʒvjss.
Fiat mistura, ejus sumantur cochl. iii.
magna post singulas liquidas sedes.

R. Fol. uvæ ursi contus. ʒss.
Aquæ ferventis Oj.
Macera, et cola.

R. Hujus infusionis fʒvii.
Tinct. kino.
Sirupi zingiberis aa fʒss.
Fiat mistura quotidie, partitis hausti-
bus, sumenda.

R. Granati baccæ cort. ʒss.
Lactis vaccini recent. lbii.
M. decoque ad lbj. Sumantur cochl.
iii. magna tertiis horis. (Chronic
diarrhœa.)

R. Pulv. nucis vomicæ ʒi.
Aquæ ʒviii.
Decoque ad ʒvi. et adde
Tinct. opil ʒxl.
Fiat mistura ejus sumantur cochl. i.
max. secundis horis. (In dysentery.)

R. Pulv. ipecac. gr. ii.
Alum. gr. vi.
Sirupi papav. q. s.
Ut fiat bolus, quartis horis sumendus.
(In chronic dysentery.)

EXTERNAL APPLICATIONS, ETC.

R. Zinci sulph. ʒj.
Aquæ destill. fʒx.
Fiat injectio frigide utenda.

R. Zinci sulph.
Alum. purific. aa ʒss.
Aquæ destill. Oj.
Fiat injectio.

R. Alum purific. ʒj.
Decocti querc. Oj.
Fiat injectio.

R. Liq. plumbi acet. ʒj.
Mist. camph. ʒij.
Aquæ destill. Oss.
Fiat solutio in rectum opē sephunculi
injicienda.

R. Liq. calcis ʒi.
Olei olivæ ʒii.
Camphoræ ʒij.
M. fiat linimentum. (Superficial in-
flammations, burns, &c.)

R. Liq. plumbi diacetat. ℥iv.-viii.
Aque destill. 3iv.

M. fiat collyrium.

R. Liq. plumbi diacetat. 3ss.

Vin. opii 3i.

Aque rosæ 3viii.

M. fiat collyrium.

R. Alum. sulph. gr. viii.-xvi.

Aque rosæ 3iv.

M. fiat collyrium. (In chronic ophthalmia.)

R. Pulv. gallæ 3i.

Opii pulv. 3i.

Adipis 3i.

M. fiat unguentum. (Hæmorrhoids.)

R. Cort. gallarum 3ss.

Aque 3xviii.

Decoque ad 3xvi. et fiat injectio. (In cases of leucorrhœa.)

DEPRESSANTS.

R. Antim. pot. tart. gr. vi.

Aque cinnamom.

Aque destill. āā f3iii.

Sirup. simplicis 3ii.

M. fiat mistura, cujus sumatur sexta pars secundis horis.

R. Aque destill. 3x.

Antim. pot. tart. gr. ss.

Sirup. papav. 3ss.

Sirup. croci 3iss.

Fiat haustus, secundis, tertiis vel quartis horis sumendus.

R. Antim. pot. tart. gr. ij.

Sacch. albi 3j.

Misce: fiat pulvis, in partes quatuor æquales dividendus, quarum sumat unam omni horâ.

R. Antim. pot. tart. gr. i.

Sacch. alb. gr. xxxi.

M. f. pulvis. (This powder admits of easy division into fractional parts, and may be given in doses proportioned to the age, in the inflammatory affections of young children.)

R. Antim. pot. tart. gr. i.

Hyd. c. cretâ gr. xii.

Sacch. alb. 3i.

M. fiat pulvis in chartulas viii. dividenda. Sumat. i. ter vel quater quotidie. (In cutaneous affections with inflammatory action of the skin, in pertussis and bronchitis of children.)

R. Tabaci fol. 3i.

Aq. fervent. 3viii.

Macera per horam et cola. Fiat enema. (In ileus, strangulated hernia, tetanus, &c.)

DIAPHORETICS.

R. Pulv. ipecac. comp. gr. v.

Fiat pulvis diaphoreticus sextâ quâque horâ sumendus, ex haustu salino communi.

R. Pulv. ipecac. c. gr. x.

Confect. aromat. q. s.

Ut fiat bolus, horâ somni sumendus.

R. Pulv. ipecac. gr. j.

Pulv. antim. gr. iij.

Hydrarg. submuriatis gr. ½.

Sacch. purificati gr. vj.

Fiat pulvis ex sirupo sumendus.

R. Hydrarg. submur. gr. ½.

Pulv. Jacobi veri gr. iij.

Pulv. scillæ gr. ½.

Conservæ rosæ caninæ gr. iij.

Misce, fiat pilula.

R. Liq. ammon. acet. f3iij.

Aque destill. f3x.

Potas. nitrat. gr. viij.

Sirupi aurantii f3j.

Vin. antim. pot. tart. ℥xx.

Fiat haustus.

R. Potas. nitratis 3j.

Mist. amygd. f3jss.

Sirupi rosæ f3j.

Misce: fiat haustus.

R. Potassæ carb. gr. xviii.

Succ. limonis 3iv.

Aque destill. 3i.

Vin. ant. pot. tart. ℥xx.-xxx.

M. fiat haustus tertiis vel quartis horis sumendus.

R. Spirit. æther. nit. 3iii.

Vin. ipecac. 3i.

Mist. camph. 3v.

Sirup. simp. 3ss.

M. f. mistura cujus sumantur cochl. ii. ampla tertiis vel quartis horis.

R. Vin. colch. 3ss.

Liq. ammon. acet. 3ii.

Mist. camphoræ 3i.

M. fiat haustus sextis horis sumendus. (Gout and muscular rheumatism.)

R. Liq. ammon. acet. ℥ss

Mist. camph. ℥vii.

Sirup. aurantii ℥i.

M. fiat haustus tertiis horis sumendus.

R. Ammon. sesquicarb. ℔i.

Aquæ ℥ss.

Sirupi simp. ℥i.

M. f. haustus cum succi limonis cochl. i. amplo quartis horis repetendus.

R. Tinct. guaiaci ammon. ℥i.

Tinct. opii ℥x.

Pulv. tragacanth. ℔i.

Aquæ cinnam. ℥i.

Fiat haustus ter die sumendus. (Chronic rheumatism.)

EXPECTORANTS.

R. Vin. antim. pot. tart. f℥ij.

Liq. ammon. acet f℥j.

Aquæ menthæ viridis f℥vss.

Oxymellis ℥ss.

Misce: sumat æger cochleare unum magnum quartis vel sextis horis.

R. Aceti scillæ ℥ij.

Oxymellis ℥ij.

Misce: sit dosis cochleare minimum subinde.

R. Aceti scillæ f℥j.

Oxymellis ejusdem f℥vj.

Aquæ menthæ viridis f℥vj.

Misce: sumat æger cochleare unum parvum subinde.

R. Aceti communis f℥ss.

Sirupi tolutani f℥j.

Aquæ destill. f℥v.

Vin. antim. pot. tart. ℥i.

Misce: sumantur cochl. duo magna frequenter.

R. Vini. ipecac.

Potassæ carb. āā ℥ss.

Aquæ ℥vi.

M. f. mistura ejus sumantur cochl. ii. ampla cum cochl. uno succi limonis inter effervescentiam tertiis horis.

R. Pulv. scillæ.

Pulv. ipecac. āā gr. x.

Ext. conii ℥ss.

M. f. massa in pil. x. dividenda sumat i. ter die.

R. Pil. scillæ c.

Ext. conii āā ℥ss.

M. f. massa in pil. xx. dividenda. Sumat ii. ter die.

R. Vin. ant. pot. tart. ℥i.-℥ii.

Tinct. opii ℥ii.

Mucil. acac.

Sirup. limon. āā ℥ss.

Aquæ ℥i.

M. fiat mistura, sumat cochl. i. vel. ii. minim. secundis horis. (Pneumonia of young children.)

R. Asafoetidæ ℔i.

Pulv. ipecac. ℥ss.

Scillæ pulv. gr. x.

Sapon. duri.

Sirup. tolut. āā q. s.

Ut fiat pil. xvi. Sumat unum quartis horis.

R. Decoct. senegæ ℥i.

Liq. ammon. acet. ℥ss.

Sirup. papav. ℥i.

M. fiat haustus quartis horis adhibendus.

R. Sodæ carb. ℥ss.

Vini ipecac. ℥i.

Tinct. opii ℥x.

Sirupi. tolut. ℥iii.

Aquæ ℥ss.

Fiat mist.: sumat cochl. i. amplum tertiis vel quartis horis.

R. Decoct. senegæ ℥viii.

Tinct. camph. comp. ℥i.

Sirupi zingib. ℥ss.

Mist. acaciæ ℥i.

M. fiat mist.: sumantur cochl. ii. magna tertiis vel quartis horis.

R. Tinct. digital. ℥x.

Oxymel. scillæ ℥ss.

Tinct. opii ℥v.

Mist. camphoræ.

Aquæ āā ℥ss.

M. fiat haustus, quartis horis sumendus.

R. Mist. ammoniaci ℥iv.

Vin. antim. pot. tart. ℥iii.

Tinct. camphoræ comp. ℥v.

Sirup. tolut. ℥i.

M. fiat mistura: sumat cochl. i. med. urgente tussis.

EMETICS.

R. Vini ant. pot. tart. ʒij.
Fiat haustus emeticus.

R. Vini ipecacuanhæ fʒss.
Fiat haustus emeticus.

R. Pulv. ipecac. fʒi.
Aque menthæ pip. ʒi.
M. fiat haustus (to be followed by large and repeated draughts of warm water).

R. Pulv. ipecac. ʒi.
Vin. ant. pot. tart. ʒii.
Aque menthæ sativ. ʒiss.
M. f. haustus emeticus.

R. Vin. ant. pot. tart. ʒi.
Sumat cochl. i. minim vel med. singulis horæ quadrantibus donec supervenerit vomitus.

R. Zinci sulph. ʒi.
Aque cinnam.
Aque puræ aa ʒss.
Fiat emeticus statim sumendus.

R. Cupri sulph. gr. x.
Aque ʒiss.

M. f. haustus emeticus statim sumendus.

R. Tabaci fol. ʒi.
Aque tepidæ q. s.
Contunde. Fiat epithema epigastrio applicand. (Must be removed as soon as sickness takes place.)

R. Sinapis pulv. ʒss.
Aque ʒiii.
M. sumatur dimidium statim. et quod restat post horæ quadrantem si opus sit.

R. Ammon. carb.
Pulv. ipecac. aa ʒi.
Tinct. capsici ʒi.
Aque menthæ pip. ʒii.
M. f. haustus emeticus. (These more stimulating emetics are required when the sensibility of the stomach is impaired, as in poisoning with opium.)

LAXATIVES, APERIENTS, CATHARTICS.

R. Potassæ tartratis ʒss.
Mannæ optimæ ʒvj.
Aque menthæ viridis fʒvi.
Tinct. lavandulæ comp. f ʒss.
Fiat mistura, cujus sumat æger cochl. tria, pro re natâ.

R. Infus. rosæ fʒvij.
Magnesiæ sulphatis ʒvj.
Sirupi rosæ fʒss.
Fiat mistura cujus capiat æger cochl. iv. sextâ quâque horâ.

R. Confectionis aromaticæ.
Pulveris rhei aa ʒi.
Aque menthæ piper. fʒxi.
Tinct. cardamomi ʒjss.
Sirupi zingiberis ʒj.
Fiat mist: sumat cochl. iii. magnâ quartâ vel sextâ quâque horâ.

R. Magnesiæ sulphatis ʒiij.
Infusi sennæ fʒxij.
Sirupi rosæ fʒij.
Fiat haustus aperiens.

R. Aque menthæ piper. ʒj.
Rhei pulv. ʒj.
Magnesiæ calcin. ʒiss.
Pulv. zingiberis ʒj.
Sit dosis ʒss. ter quaterve in die.

R. Sodæ carbon. exsic.
Sapon. duri aa gr. iv.
Pulv. rhei q. s.
Fiant pilulæ duæ nocte maneque sumendæ.

R. Asafoetidæ gr. vj.
Pulv. rhei. gr. iv.
Olei anisi ʒij.
Fiant pilulæ duæ quartâ vel sextâ quâque horâ sumendæ.

R. Sulphuris loti.
Potassæ supertartratis aa ʒj.
Pulv. jalapæ ʒj.
Pulv. cinnam. comp. ʒj.
Mellis vel theriacæ q. s.
Fiat electuarium cujus sumatur cochleare medium bis vel ter in die.

R. Myrrhæ optimæ ʒss.
Olei juniperi ʒi.
Pulveris rhei q. s.
Fiat bolus ter in die sumendus.

R. Potassæ tartratis ʒjss.
Infusi quassîæ fʒij.
Infusi sennæ fʒiv.
Tinct. ejusdem.
Sirupi aurantii aa fʒss.
Fiat mistura, cujus sumat æger cochlearia tria magna ter in die.

R. Saponis duri gr. vj.
Ext. colocynth. comp. gr. ij.
Ext. gentianæ gr. ij.
Pulv. rhei q. s.
Fiant pilulæ duæ ter in die sumendæ,
superbibendo haustu infusi anthemi-
dis.

R. Hydrarg. submuriatis gr. j.
Pulv. rhei gr. vj
Saponis duri gr. iv.
Fiant pilulæ duæ singulis auroris su-
mendæ.

R. Radicis armoraciæ cont. ʒij.
Seminis sinapis.
Radicis valerianæ aa ʒij.
Radicis rhei incisæ ʒss.
Infunde in vini hispanici Oij.
Sæpe agitetur, et coletur, cochlearia
duo magna quartâ quâque horâ su-
menda.

R. Pulv. rhei ʒj.
Potass. supertartratis ʒj.
Pulv. cinnam. comp. gr. v.
Fiat pulvis aperiens.

R. Potass. tartratis ʒj.
Pulv. rhei gr. x.
Infusi sennæ f ʒxij.
Sirupi aurantii.
Tinct. cardam. comp. aa f ʒj.
Misce pro haustu aperiente.

R. Pulv. rhei gr. xij.
Pulv. cinnam. comp. gr. v.
Hydrarg. submuriatis gr. ij.
Fiat pulvis aperiens, ex pauxillo mellis
sumendus.

R. Ext. gentianæ.
Ext. colocynth comp. aa ʒss.
Fiant pilulæ xij.: sumantur duæ pro
re natâ.

R. Olei ricini f ʒj.
Aque hordei f ʒij.
Fiat haustus.

R. Olei ricini f ʒjss.
Vitellum ovi unius.
His rite terendo subactis, adde paula-
tim.

Aq. menthæ viridis f ʒv.
Sirupi aurantii f ʒss.
Ut fiant mistura aperiens, de qua capi-
at æger cochl. tria omni bihorio donec
alvus soluta sit.

R. Magnesie sulph. ʒvj.
Mannæ optimæ ʒj.
Aque destill. f ʒxij.
Fiat haustus.

R. Potass. tartratis ʒijj.
Mannæ optimæ ʒj.
Aque destill. f ʒvj.
Misce: fiat mistura cujus sumantur
cochl. tria magna tertiâ quâque horâ,
vel pro re natâ.

R. Antim. pot. tart. gr. j.
Magnesiæ sulph. ʒj.
Aque destill. f ʒvjss.
Sirupi aurantii f ʒss.
Solve ut fiant mistura cathartica: su-
mantur cochl. tria magna quolibet
bihorio donec alvus bene purgaverit.

R. Pil. aloes cum myrrhâ gr. vj.
Sapon. duri gr. iv.
Fiant pilulæ duæ nocte maneque su-
mendæ.

R. Aloes socotrinæ gr. iij.
Sapon. duri gr. vj.
Fiant pilulæ duæ bis die sumendæ.

R. Potass. subcarbon. ʒjss.
Myrrhæ contusæ ʒj.
Aloes socotrinæ ʒjss.
Croci ʒss.
Aque destill. Oj.
Coque ad ʒxij.; et liquori colato adde
Tinct. cardam. comp. ʒiv.
Sirupi zingiberis f ʒjss.
Sit dosis cochl. duo magna bis die.

R. Hydrarg. submuriatis gr. v
Pulv. antim. gr. iij.
Pulv. cinnam. comp. gr. ij.
Fiat pulvis catharticus ex sirupo su-
mendus.

R. Hydrarg. submuriatis gr. ij.
Pulv. antim. gr. iij.
Fiat pulvis catharticus ex sirupo su-
mendus.

R. Gummi-resin. scammon. gr. iv.
Hydrarg. submuriat. gr. iij.
Sacch. pur. gr. v.
Fiat pulvis catharticus ex pauxillo
mellis sumendus.

R. Pulv. scammon. comp. ʒss.
Hydrarg. submuriat. gr. v.
Fiat pulvis catharticus.

R. Herbæ gratiolæ incisæ ʒijj.
Foliorum sennæ ʒjss.
Ext. glycyrrhizæ ʒijj.
Elect. cassiæ ʒijj.
Aque destill. Ojss.
Leniter coque per quadrantem horæ,
addendo sub finem coctionis; Myrrhæ
optimæ f ʒj.; Potassæ sulphatis ʒjss.:
Cola pro usu: et sumat æger cyathum
parvum pro re natâ.

- R. Ext. colocynth. comp.
Ext. jalapæ ʒss.
Gambogiæ ʒss.
Olei juniperi ℥iv.
Fiant pilulæ xij., quarum sumantur tres omni horâ donec alvus ter quaterve respondeat.
- R. Pil. aloes cum myrrhâ gr. vj.
Pulv. baccæ capsici gr. iij.
Fiant pilulæ duæ.
- R. Hydrarg. submuriat. gr. v.
Fiat pulvis, pro re natâ sumendus ex sirupo vel melle.
- R. Ext. colocynth. comp. gr. vj.
Pil. galban. comp. gr. iij.
Olei carui ℥ij.
Fiant pilulæ duæ.
- R. Pulv. aloes comp. gr. viij.
Olei anisi ℥ij.
Fiant pilulæ duæ.
- R. Tinct. sennæ ʒj.
Vini aloes ʒij.
Aquæ menthæ piper. fʒiij.
Sirupi zingiberis fʒj.
Misce; sumantur cochl. duo magna pro re natâ.
- R. Potass. tartratis ʒss.
Infus. sennæ ʒvss.
Tinct. ejusdem fʒjss.
Sirupi zingiberis fʒss.
Fiat mistura, cujus sumantur cochl. tria magna pro re natâ.
- R. Ext. colocynth. comp. gr. vj.
Hydrarg. submuriatis gr. iij.
Fiat bolus aperiens, vel sint pilulæ duæ.
- R. Pil. aloes cum myrrhâ ʒj.
Hydrarg. submuriatis gr. iij.
Fiant pilulæ xij., quarum sumat ægra unam vel duas pro re natâ.
- R. Pulv. aloes cum ferro ʒj.
Sapon. duri ʒij.
Sirupi zingiberis q. s.
Fiat massa in pilulas xxiv. dividenda, quarum sumantur duæ alterna quâque nocte.
- R. Tinct. aloes comp. fʒss.
Pro dosi alternis auroris.
- R. Pulv. scammonie ʒss.
Hydrarg. submuriatis ʒj.
Ext. colocynth. ʒj.
Sirupi zingiberis q. s.
Fiat massa in pilulas xij. dividenda, quarum tres pro dosi sumendæ.
- R. Extract. elaterii gr. ij.
Sacch. pur. ʒj.
Optime terantur simul, dein in pulveres octo æquales dividuntur quorum capiat æger unum omni horæ quadrante donec adsit catharsis.
- R. Jalapinæ.
Pulv. rhei ʒā gr. ii.
Pulv. ipecac. gr. i.
Olei carui ℥ij.
Fiat pilula omni nocte sum.

ENEMATA.

- R. Magnesie sulph. ʒj.
Aquæ frigidæ fʒx.
Fiat enema.
- R. Ext. aloes socotrine ʒj.
Lactis communis ʒvj.
Solve pro enemate.
- R. Ext. colocynth. ʒj.
Infus. sennæ fʒxij.
Fiat enema.
- R. Infus. anthemidis fʒx.
Sodæ sulphatis ʒj.
Fiat enema purgans.
- R. Decoct. althææ fʒx.
Sodæ sulphatis ʒvj.
Olei olivæ fʒj.
M. f. enema purgans.
- R. Decocti seminis avenæ fʒxij.
Sodæ sulphatis ʒj.
Olei olivæ fʒjss.
Fiat enema purgans.
- R. Scammonie pulverisatæ ʒss.
Sapon. duri ʒjss.
Aquæ ferventis fʒviij.
Fiat enema quartâ quâque nocte injiciendum.

DIURETICS.

- R. Pilulæ scillæ gr. vj.
Pilulæ hydrarg. gr. iijss.
Fiant pilulæ duæ nocte maneque sumendæ.
- R. Pulv. digitalis gr. j.-ij.
Hydrarg. submuriatis gr. i.
Pilulæ scillæ gr. vj.
Fiat bolus ter in die adhibendus.

R. Infus. armoraciæ comp. f3xij.
 Spirit. æther. nitrici f3j.
 Sirupi aurantii f3j.
 Fiat haustus ter in die sumendus.

R. Potass. acet. ʒi.
 Infus. quassiae f3xij.
 Tinct. digitalis ʒxx.
 Fiat haustus ter in die sumendus.

R. Potass. acet. ʒss.-ʒj.
 Sirupi simplicis ʒiij.
 Spirit. æther. nitros ʒi.
 Sit dosis ʒj. bis vel ter in die.

R. Copaibæ fʒss.
 Vitellum unius ovi.
 Sacch. pur. ʒi.

His bene subactis terendo, adde paulatim.

Aquæ menthæ viridis f3vj.
 Ut fiant emulsio, cujus capiat æger cochl. tria magna ter in die.

R. Terebinth. de chio gr. iii.
 Sapon. duri gr. iv.
 Pulv. calumbæ q. s.
 Fiant pilulæ duæ ter in die sumendæ.

R. Potassæ nitrat. ʒii.
 Mist. amygdal. lbij.
 Solve: fiat emulsio. Sit dosis cochl. iii. magnâ omni horâ.

R. Potassæ nit. gr. x.
 Potassæ bitartrat. gr. xv
 Pulv. acac. gr. x.
 Sacch. ʒss.

M. fiat pulvis ex hordei decocti tepidi cyatho quartis vel tertiis horis sumendus.

R. Potassæ bitart. ʒil.
 Aquæ fervent. lbij.
 Cort. limon. et sacch. q. s. ut fiat potus communis.

R. Pil. scillæ comp. ʒi.
 Hyd. chloridi gr. v.
 M. divide in pil. xx. Sumat duas mane nocteque.

R. Infus. digital. ʒiv.
 Potassæ acetat. ʒi.
 Spirit. æther. nit. ʒi.
 Liq. ammon. acet. ʒv.
 M. fiat haustus sextis vel quartis horis sumendus.

R. Junip. Bacc. contrit. ʒii.
 Sem. anisi contus. ʒii.
 Aquæ ferventis lbj.
 M. macera per horis tres et cola; sumat æger cyathum subinde.

R. Pulv. jalapæ c. ʒj.-ʒss.
 Hydrarg. subm. ʒss.-ʒj.
 Pulv. scillæ.
 Pulv. digitalis aa gr. j.-ij.
 Pulv. cinnam. comp. ʒj.
 Pulv. sacchari puri ʒss.
 Tere intime et divide in chartulas decem, quarum sumat unam mane nocteque nisi alvus soluta sit. (Diuretic and purgative.)

R. Tinct. ferri muriat. ʒxii.
 Tinct. hyoscyami ʒxx.
 Sumatur omni horâ quadrante donec supervenerit urinæ fluxus. (Retention of urine, dysuria, &c.)

R. Spartii cacumin. concis. ʒi.
 Aquæ lbj.
 M. decoque ad dimidium, cola, et adde Spirit. æther. nit. ʒii.
 Sirup. zingiberis ʒvi.
 M. fiat mist. Sumat cochl. duo ampla alternis horis.

R. Uvæ ursi ʒiss.
 Sodæ carb. exsicc. ʒss.
 Pulv. cinnam. c. ʒss.
 Confect. rosæ ʒss.
 Sirupi q. s.
 Ut fiat electuarium, cujus sumatur cochl. i. amplum omni horâ. vel alternis horis. (Chronic inflammation of the kidneys and bladder, calculous affections, &c.)

R. Acet. colch. ʒss.
 Potassæ acet. ʒii.
 Aquæ fœnic. ʒvii.
 Spirit. junip. comp. ʒss.
 M. fiat mistura. Sumat cochl. ii. magna ter die.

R. Infus. diosmæ crenatæ (buchu) ʒviii.
 Tinct. diosmæ.
 Spirit. junip. c. aa ʒss.
 M. fiat mistura. Sit dosis cochl. ii. ampla.

R. Decoct. uvæ ursi.
 Liq. calcis aa ʒiv.
 M. sumat cyathum vinosum quater in die.

R. Infus. parciræ ʒviii.
 Acid. nitr. dil. ʒxl.
 Tinct. hyoscyami ʒil.
 M. fiat mistura cujus sumantur cochl. iii. magna ter quaterve in die.

ANTHELMINTICS.

R. Ol. terebinth. ℥ss.-℥ii.

Decoct. hordei ℥ii.

M. fiat haustus. (In tænia. The dose to be repeated every morning, or every other morning, for three or four times in succession, and followed at the end of two hours by a full dose of castor oil.)

R. Ol. terebinth. ℥ss.

Ol. ricini ℥i.

M. fiat haustus. (In tænia.)

R. Dolichi pubis mucunæ ℥l.

Theriacæ ℥i.

M. fiat electuarium. Sit dosis cochl. i. min. omni mane. (In lumbrici and ascarides: should be followed by an occasional purgative.)

R. Hydr. chloridi gr. vi.

Jalapæ pulv. ʒi.

M. fiat bolus. (In tænia.)

R. Stanni pulv. ℥i.

Ext. artem. absinth.

Pulv. jalapæ aa ℥i.

Sirup. simp. q. s.

Ut fiat massa in bolos xii. divid. Sumat unum, singulis semis-horis donec bene dejecerit alvus.

R. Pulv. rad. granati cort. ℥ss.

Divide in pulv. vi. Sumat unum omni semi-horâ ad sextam vicem. (The

last dose should be followed by an aperient. In tapeworm.)

R. Semin. santonici.

Semin. tanacet. aa ℥ss.

Pulv. valer.

Pulv. jalap.

Sulph. potass. aa ʒii.

Oxymel. scillæ q. s.

Ut fiat electuar. Sumat cochl. i. min. omni nocte maneque. (Lumbrici and ascarides.—*Bremser*.)

R. Artemesiæ santonicæ ʒi.

Hydrarg. chlorid. gr. vi.

Pulv. rhei ʒss.

Camphoræ gr. xii.

Sirup. simp. q. s.

M. divide in bolos ii. Sumat unum mane, et alterum post horas sex, nisi prius bene dejecerit alvus.

R. Cort. rad. granati ʒii.

Aquæ ʒbii.

Macera per horis xxiv. et decoque ad ʒbi. Huic adde,

Sirupi zingib. ʒi.

M. divide in partes tres. Sumat unam omni semi-horâ ad tertiam vicem.

R. Decoct. felicis. maris ʒiv. (ʒiss. ad ʒbii.)

Æther sulph. ʒi.

M. fiat haustus mane sumendus. (This may be followed up by an enema containing the same ingredients.)

ENEMATA.

R. Absinthii.

Tanaceti aa ʒiii.

Valer. rad. contrit. ʒii.

Cort. aurant. ʒi.

Aquæ fervent. ʒviii.

Macera per horam et cola. Fiat enema nocte maneque injiciendum. (In ascarides.)

R. Mist. asafoet.

Lactis vacc. aa ʒiv.

M. fiat enema, h. s. injic.

R. Tinct. ferri mur. ʒiv.

Aquæ ʒviii.

M. fiat enema. (Ascarides; a purgative of calomel and jalap being given simultaneously—*Darwell*—and chamomile tea being drunk thrice a day for a fortnight afterward.)

R. Ol. terebinth. ℥l.

Decoct. amygd. ʒviii.

M. fiat enema, h. s. utendum.

EMMENAGOGUES.

For this class of remedies, see Tonics, especially those containing steel, myrrh, and aloes. The stronger emmenagogues, such as savin, are rarely used. A stimulant injection, containing ℥xii. of liquor ammoniæ to ʒiss. of warm milk, has been recommended.

ANTACIDS.

- R. Liq. potassæ ℥xx.
Mist. cretâ ʒi.
Tinct. calumbæ ʒi.
M. fiat haustus ter die sumendus.
- R. Liq. potassæ ʒii.
Liq. calcis ʒvi.
M. fiat mistura. Sumantur cochl. i. vel ii. ampla e jusculi tenuis poculo. (In acidity, with tendency to lithic acid deposit in the urine.)
- R. Liq. calcis ʒviss.
Liq. potassæ ʒiss.—ij.
Magnesiæ calcin. ʒj.
Mellis ʒj.
Olei menthæ pip. ℥v.
Sit dosis cochl. ampl. ter quaterve in die.
- R. Liq. potassæ fʒij.
Liq. calcis fʒvss.
Magnesiæ calcin. ʒj.
Misce: capiat æger cochleare magnum bis in die ex poculo jusculi bovini.
- R. Potassæ carb. gr. x.
Infus. gent. comp. ʒiss.
Tinct. cascarillæ ʒi.
M. fiat haustus ter die sumendus.
- R. Sodæ carb. exsicc. ʒiss.
Pulv. cinnam. comp.
Saponis aa ʒss.

- Balsam. Peruv. q. s.
Ut fiat pil. xxx. Sumat iij. ter die.
- R. Liq. calcis.
Lactis. vac. aa ʒvi.
M. sit pro potu.
- R. Magnes. ʒi.
Aquæ menthæ pip. ʒxv.
Tinct. aurantii ʒi.
M. fiat haustus p. r. n. sumendus.
- R. Magnes. sulphat. ʒi.
Magnes. carb. gr. x.
Aquæ menthæ pip.
Infus. gent. comp. aa ʒvi.
M. fiat haustus ter die sumendus. (Antacid and aperient.)
- R. Magnes. carb. ʒii.
Pulv. rhei ʒii.
Spir. ammon. arom.
Sirup. zingib. aa ʒiv.
Aquæ puræ ʒiiiss.
M. fiat mistura cujus sumantur cochl. ii. ampla ter quotidie. (In gastralgia, pyrosis, &c.)
- R. Tinct. opii ʒii.
Tinct. rhei.
Tinct. humili aa ʒiii.
M. Sit dosis ℥xxx. ter die ex aquæ cyatho parvo.

DEMULCENTS AND EMOLLIENTS.

- R. Camphoræ.
Potassæ nitr. aa ʒi.
Pulv. acaciæ ʒi.
Mist. amygd. ʒvi.
M. fiat mistura. Sumat cochl. duo ampla secundis vel tertiis horis. (Chordee, strangury, &c., with diluents.)
- R. Cetacei ʒii.
Vitel. ovi unius.
Sirup. tolut. ʒss.
Aquæ cinnam. ʒiss.
Aquæ ʒiv.
Fiat mistura. Sumat cochl. i. amplum subinde. (Bronchitis.)
- R. Potassæ nitr. ʒi.
Mannæ opt. ʒi.
Infus. lini comp. Oii.
M. fiat mistura cujus sumat cyathum vinosum subinde. (In gonorrhœa.)
- R. Acaciæ gummi ʒss.
Aquæ lbii.
Solve. Sit pro potu communi.

- R. Cornu cervi rament. ʒiv.
Micæ panis ʒi.
Aquæ lbiii.
Decoque ad bibras ii. Cola. Adde, Sirup. simp. ʒii.
Aquæ cinnam. ʒss.
M. Sumat subinde cochl. ii. vel iij. ampla. (In chronic diarrhœa, and in advanced stages of inflammatory affections, when a little nutriment is required.)
- R. Althææ offic. ʒi.
Aquæ bullient. lbj.
Sir. simp. q. s.
Sit pro potu ad libitum. (In affections of the urinary organs.)
- R. Ichthyocollæ ʒii.
Aquæ lbii.
Decoque ad lbj. Cola et adde Lactis vaccini lbj.
Sacchari ʒi.
M. Sumat cochl. iii. vel iv. ampla subinde. (Demulcent and nutritive.)

EXTERNAL APPLICATIONS.

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| <p>R. Decoct. althææ rad. lbj.
Liq. plumbi diacet. ʒi.-ʒii.
M. fiat lotio. (In various forms of cutaneous disease, as lichen cæzema, and impetigo.)</p> <p>R. Feculæ tuber. solani.
Decoct. rad. althææ aa q. s.
M. et coque ad spissitudinem idoneam pro cataplasmate.</p> | <p>R. Furfuri tritici lbiv.
Aque frigidæ lbxii.
M. coque simul, cola et adde balneo tepido. (To form an emollient bath in acute cutaneous diseases.)</p> <p>R. Decoct. dulcamaræ.
Decoct. althææ aa lbss.
M. fiat lotio. (In cutaneous diseases with much irritation of the skin.)</p> |
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ALTERATIVES.

(Including Antisyphilitic, Antiphlogistic, and Deobstruent Remedies.)

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|--|---|
| <p>R. Hydrarg. c. cretâ ʒi.
Antim. pot. tart. gr. i.
Sacchari ʒi.
M. f. pulvis in chart. xii. distribuendus.
Sumat i. ter die.</p> <p>R. Hydrarg. c. cretâ ʒss.
Pulv. ipecac. gr. x.
Pulv. rhei ʒii.
Pulv. cinnam. c. gr. x.
Sacchari albi ʒi.
Divide in pulv. x. Sumat unum bis terve in die.</p> <p>R. Hydrarg. chloridi gr. ʒ.
Ext. opii gr. ss.
Confectionis rosæ q. s.
Fiat pilula ter in die sumenda.</p> <p>R. Hydrarg. chloridi gr. ʒ.
Sulph. antim. præcipit. gr. ʒ.
Confectionis opii q. s.
Fiat pilula ter in die sumenda.</p> <p>R. Hydrarg. chloridi.
Sulph. antim. præcipit. aa ʒj.
Terantur simul in mortario per horam unam integram ut fiat pulvis subfuscus.</p> <p>R. Hujus pulveris gr. j.
Confectionis rosæ gr. v.
Misce ut fiat pilula ter in die sumenda.</p> <p>R. Hydrarg. chloridi gr. j.
Ext. conii gr. iij.
Misce ut fiat pilula ter in die sumenda.</p> <p>R. Pulv. opii.
Hydrarg. chloridi aa gr. ʒ.
Pulv. antim. gr. iij.
Fiat pulvis octavâ quâque horâ sumendus, ex pauxillo mellis.</p> <p>R. Pil. hyd. chlor. comp. ʒss.
Ext. sarsæ.
Ext. tarax aa ʒi.
Divide in pil. xxx. Sumat ij. ter die.</p> | <p>R. Pilulæ hydrarg. gr. j.
Guaiaci gummi resinæ gr. viij.
Mucilaginis acaciæ q. s.
Fiant pilulæ duæ ter in die sumendæ.</p> <p>R. Hydrarg. bichlorid. gr. ii.
Spir. rectific. ʒss.
Aque destill. ʒiiiss.
M. fiat mistura. Sumat cochl. unum min. e cyatho decocti hordei vel aque edulcoratæ quotidie.</p> <p>R. Hyd. bichlorid. gr. i.
Tinct. cinchon. ʒii.
Solve. Sumat cochl. i. min. bis die in cyatho infus. anthem. (In scrofula.)</p> <p>R. Potassæ iodidi gr. v.
Infus. quassæ ʒi.
M. fiat haustus, ter die sumendus. (Secondary syphilis.)</p> <p>R. Tinct. iodinii comp. ℥x.
Aque destill. ʒi.
M. f. haustus ter die sumendus. (The dose may be gradually increased.)</p> <p>R. Potassii iodidi gr. ii.
Iodinii gr. i.
Aque destill. ʒviij.
M. fiat mist. Sumat tertiam partem ter quotidie. (For children under seven years.)</p> <p>R. Ferri iodidi gr. ii.
Aque destill. ʒi.
Sirup. sim. ʒi.
M. fiat haustus ter die sumendus.</p> <p>R. Sirupi ferri iodidi ℥xxx.-ʒi. ter die ex aque cyatho.</p> <p>R. Plumbi iodidi gr. iv.
Confect. rosæ q. s.
Ut fiat pil. xii. Sumat unam nocto maneque.</p> |
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| <p>R. Ferri iodidi ʒss. ,
Ext. gentianæ ʒiss.
M. fiat massa in pilulis xxiv. divid.
Sumantur duæ vel tres ter die.</p> <p>R. Hyd. iodidi gr. i.
Ext. sarsæ.
Ext. gentianæ aa ʒi.
M. fiat massa in pil. x. distribuenda
quarum sumatur una ter die.</p> <p>R. Hyd. biniodidi gr. i.
Ext. glycirrh. ʒss.
M. et divide in pil. xvi. quarum su-
matur i. bis vel ter die.</p> <p>R. Potassii bromidi gr. xii.
Sirup. tolut. ʒi.
Aque destill. ʒiii.
M. fiat mistura, cujus sumatur cochl.
i. magnum ter die.</p> <p>R. Auri chloridi gr. v.
Ext. gentianæ.
Ext. sarsæ aa ʒi.
M. fiat massa in pil. c. distrib. sumat
unam bis terve quotidie.</p> <p>R. Ext. sarsaparillæ ʒj.
Decoct. sarsaparillæ fʒxiv.
Fiat haustus ter in die sumendus.</p> | <p>R. Ext. sarsaparillæ ʒj.
Decoct. ejusdem comp. fʒxiv.
Fiat haustus ter in die sumendus.</p> <p>R. Stipitum dulcam. contus. ʒj.
Rad. glycyrrhizæ contusæ ʒj.
Aque destill. Ojss.
Coque per quadrantem horæ, dein
cola. Bibat æger libram dimidiam
quotidie, partitis haustibus.</p> <p>R. Rad. sarsaparillæ.
Ligni sassafraſ incisi.
Ligni santali rubri.
Ligni guaiaci excisi aa ʒjss.
Radiciſ mezerei.
Seminum coriandri aa ʒss.
Aque destill. Ox.
Decoque ad octarios quinque: capiat
æger octarium unum quotidie, partitis
haustibus.</p> <p>R. Rad. sarsaparillæ Jamecen. con-
cisæ ʒiv.
Glycyrrhizæ ʒss.
Liq. calcis Oij.
Macera per horas viginti quatuor in
vase vitreo optime operculato, et in
loco frigido et obscuro; dein cola in
usum. Hujusce infusionis sumatur
quotidie dimidium partitis vicibus.</p> |
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EXTERNAL APPLICATIONS.

(Containing Mercury, Iodine, &c.)

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| <p>R. Camphoræ ʒi.
Unguenti hyd. fortior. ʒss.
Fiat unguentum, de quo illinantur gr.
x. omni nocte in extremitates.</p> <p>R. Camphoræ gr. v.
Unguenti hyd. fortior. ʒj.
Fiat unguentum, in regionem hepatis
alternâ quâque nocte, illinendum.</p> <p>R. Iodini pulveris ʒj.
Potass. hydriodatis ʒij.
Morphiæ acetatis gr. iv.
Unguenti hyd. fortior. ʒj.
Fiat unguentum cujus fricetur regio
hepatica drachmâ nocte manequæ.</p> <p>R. Iodini ʒii.
Potassii iodidi ʒss.
Aque destill. ʒviii.
M. fiat embrocatio. (A bath may be
formed by adding this to about forty
gallons of water.)</p> | <p>R. Potass. iodidi gr. vi.
Iodini gr. iii.
Aque destill. lbj.
Solve; fiat collyrium. (Scrofulous in-
flammation of the eye.)</p> <p>R. Sulphuris iodidi ʒi.
Adipis ʒss.
M. fiat unguentum. (In a variety of
cutaneous diseases.)</p> <p>R. Zinci iodidi ʒi.
Adipis ʒi.
M. fiat unguentum, cujus infricetur ʒi.
quotidie.</p> <p>R. Arsenici iodidi gr. iii.
Adipis ʒi.
M. fiat unguentum. (In cancerous
diseases, lupus, &c.; must be used
with great caution.)</p> <p>R. Bari iodidi gr. iv.
Adipis ʒi.
M. fiat unguent. (Scrofulous tumors;
requires to be used with caution.)*</p> |
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* Many of the foregoing prescriptions have been taken from the collection of formulæ in the Library of Practical Medicine, vol. v., and from Dr. Spillan's Manual of Therapeutics.

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